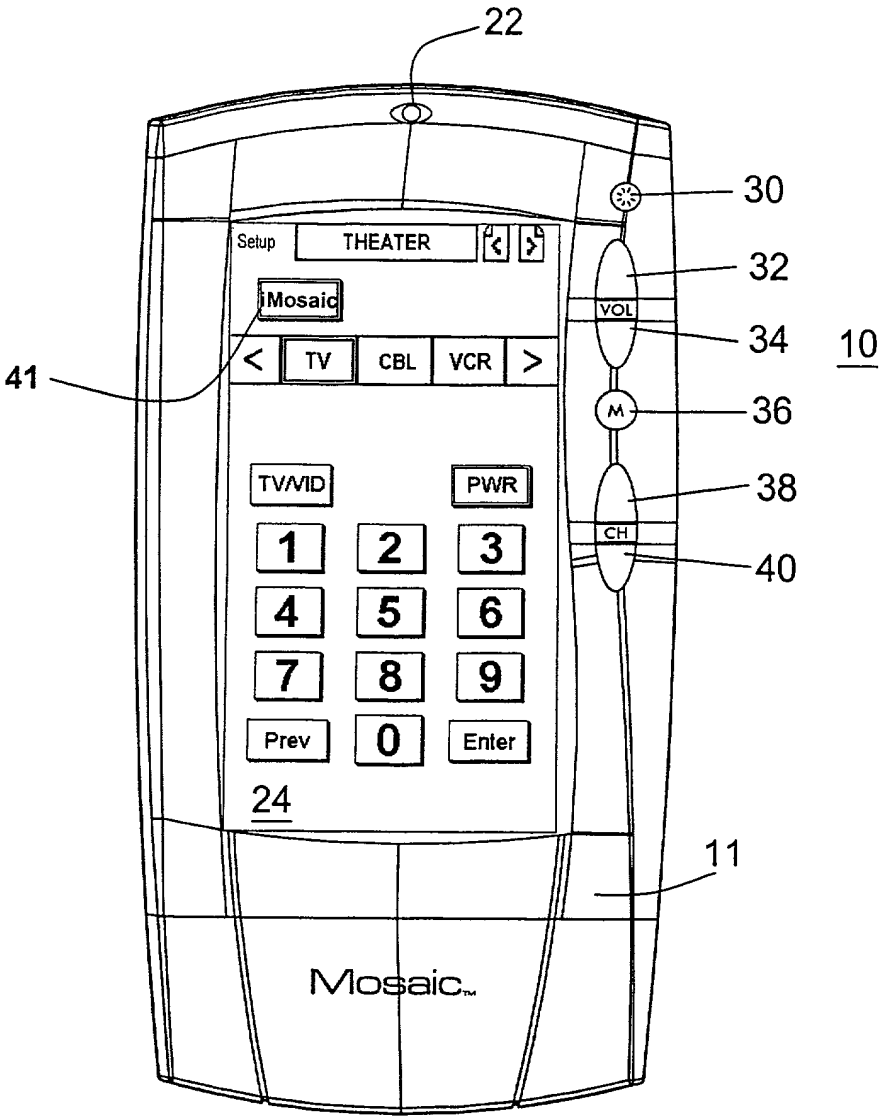

22
30
32
34
10
41
36
38
40
11
Setup
THEATER
iMosaic
TV
CBL
VCR
VOL
M
CH
TV/VID
PWR
1
2
3
4
5
6
7
8
9
Prev
0
Enter
24
Mosaic™

Figure 1

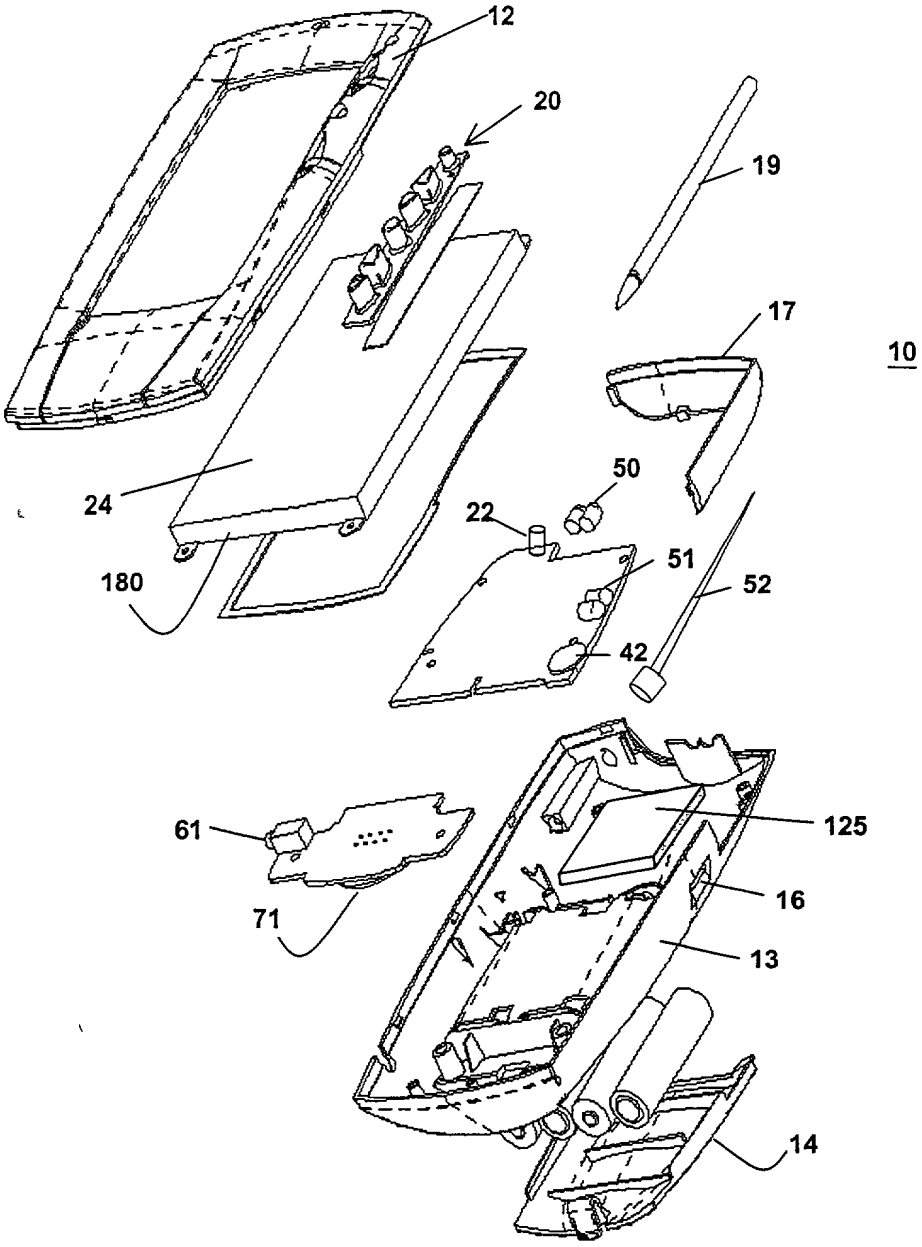


Figure 2

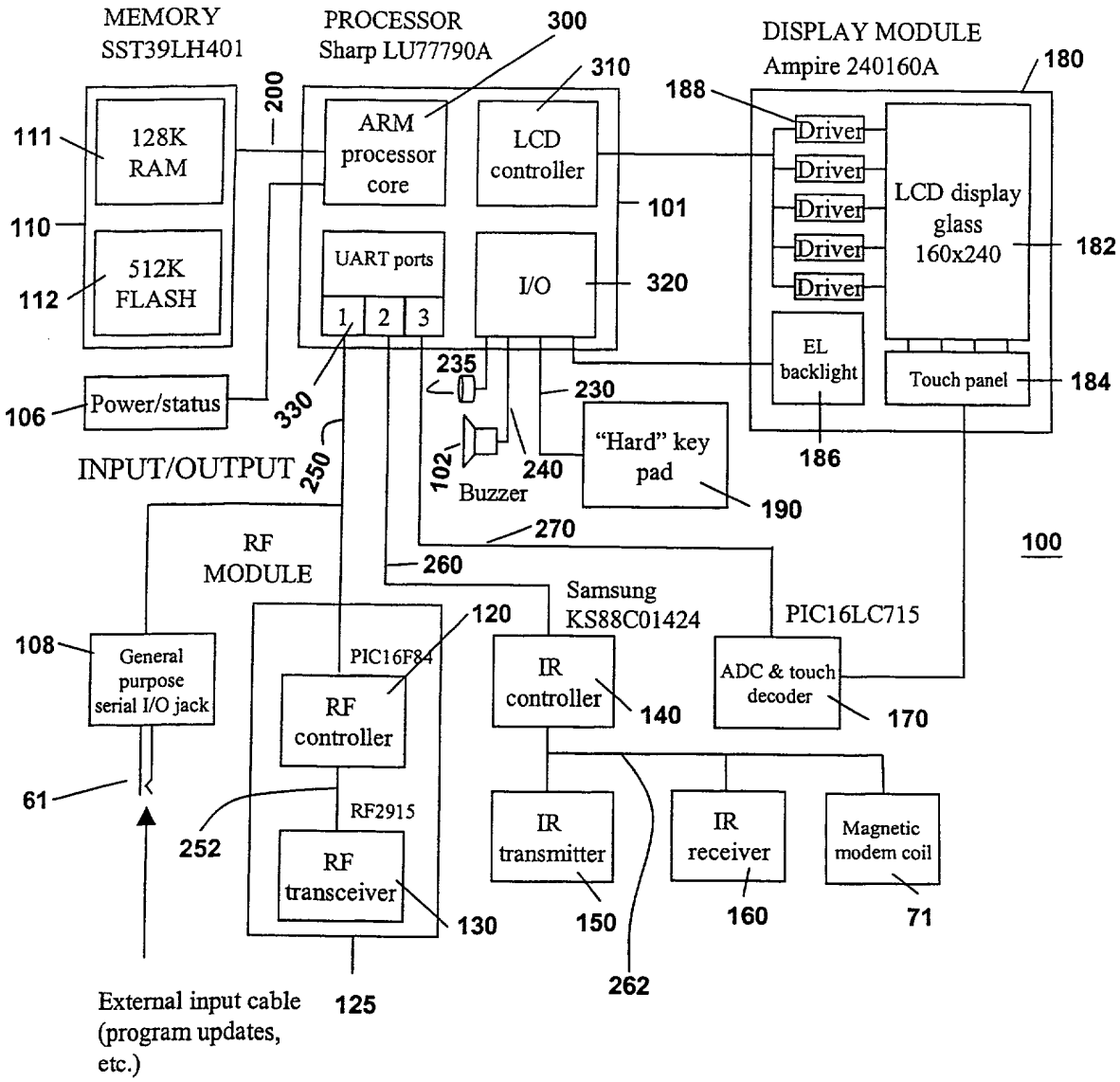

MEMORY
SST39LH401
PROCESSOR
Sharp LU77790A
300
DISPLAY MODULE
Ampire 240160A
180
200
310
188
111
128K RAM
ARM processor core
LCD controller
Driver
Driver
Driver
Driver
Driver
LCD display glass 160x240
182
101
110
512K FLASH
112
UART ports
1
2
3
I/O
320
EL backlight
Touch panel
184
235
230
106
Power/status
330
"Hard" key pad
INPUT/OUTPUT
250
102
240
Buzzer
186
190
270
RF MODULE
260
100
Samsung KS88C01424
PIC16LC715
120
108
General purpose serial I/O jack
PIC16F84
RF controller
IR controller
140
ADC & touch decoder
170
61
RF2915
252
IR transmitter
IR receiver
Magnetic modem coil
RF transceiver
130
150
160
71
262
External input cable (program updates, etc.)
125

Figure 3

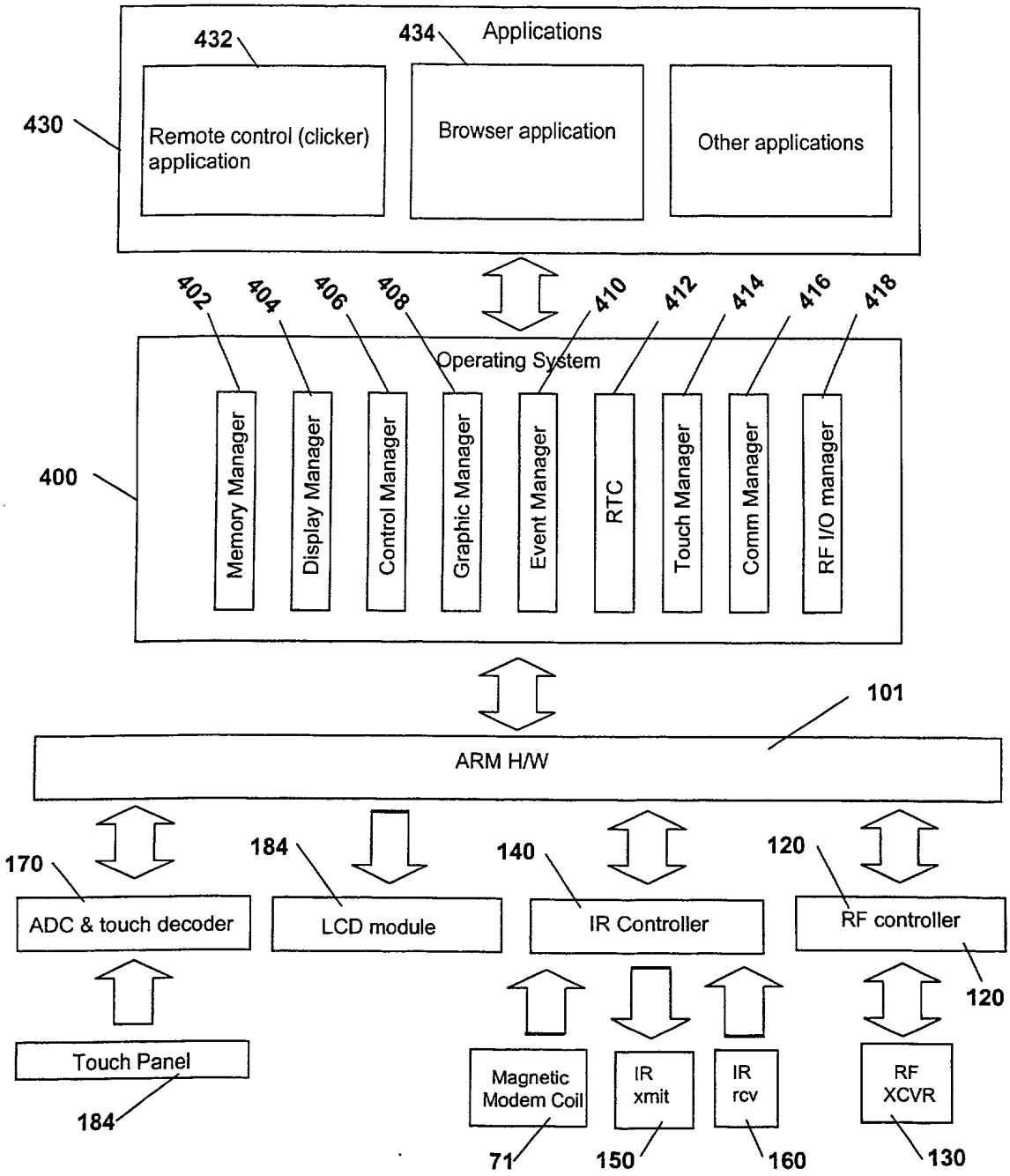

Applications
432
434
430
Remote control (clicker) application
Browser application
Other applications
402
404
406
408
410
412
414
416
418
Operating System
400
Memory Manager
Display Manager
Control Manager
Graphic Manager
Event Manager
RTC
Touch Manager
Comm Manager
RF I/O manager
101
ARM H/W
170
184
140
120
ADC & touch decoder
LCD module
IR Controller
RF controller
120
Touch Panel
184
Magnetic Modem Coil
IR xmit
IR rcv
RF XCVR
71
150
160
130

Figure 4

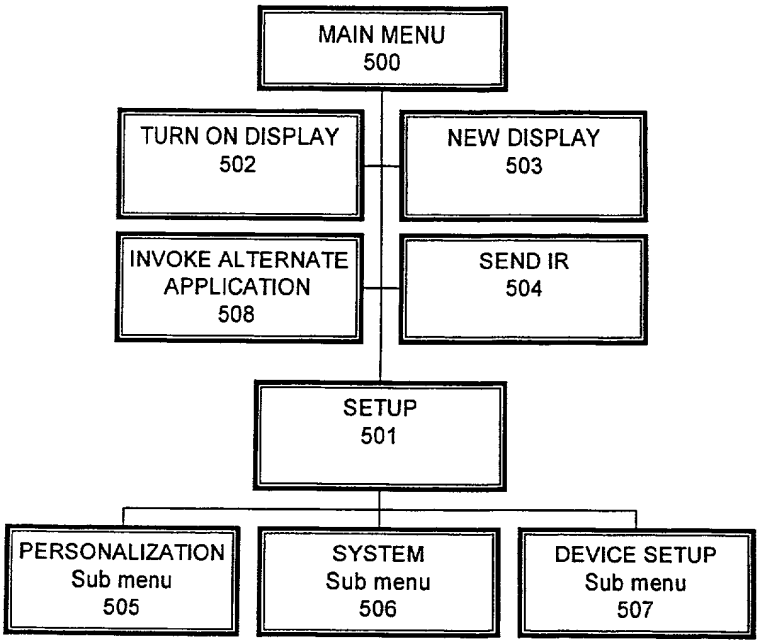

MAIN MENU
500
TURN ON DISPLAY
502
NEW DISPLAY
503
INVOKE ALTERNATE APPLICATION
508
SEND IR
504
SETUP
501
PERSONALIZATION
Sub menu
505
SYSTEM
Sub menu
506
DEVICE SETUP
Sub menu
507

Figure 5

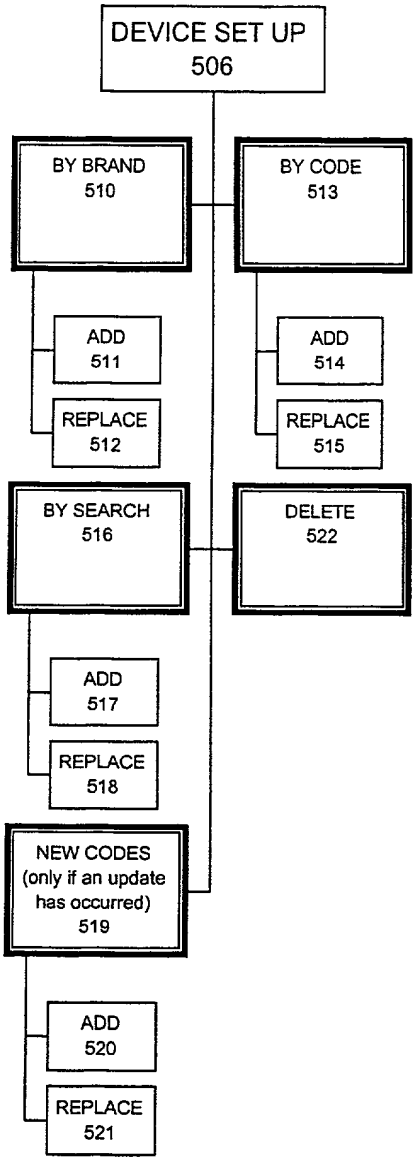

DEVICE SET UP
506
BY BRAND
510
BY CODE
513
ADD
511
REPLACE
512
ADD
514
REPLACE
515
BY SEARCH
516
DELETE
522
ADD
517
REPLACE
518
NEW CODES
(only if an update
has occurred)
519
ADD
520
REPLACE
521

Figure 6

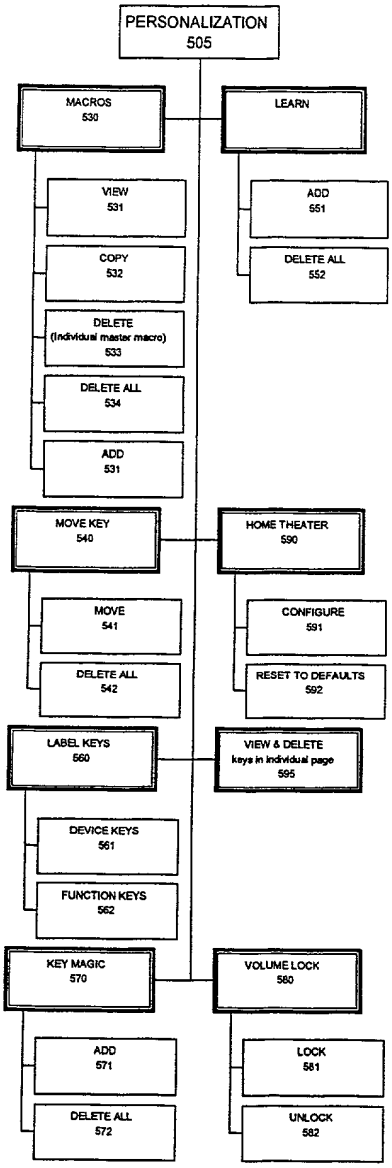

PERSONALIZATION
505
MACROS
530
LEARN
VIEW
531
COPY
532
DELETE
(Individual master macro)
533
DELETE ALL
534
ADD
531
ADD
551
DELETE ALL
552
MOVE KEY
540
HOME THEATER
590
MOVE
541
DELETE ALL
542
CONFIGURE
591
RESET TO DEFAULTS
592
LABEL KEYS
560
VIEW & DELETE
keys in individual page
595
DEVICE KEYS
561
FUNCTION KEYS
562
KEY MAGIC
570
VOLUME LOCK
580
ADD
571
DELETE ALL
572
LOCK
581
UNLOCK
582

Figure 7

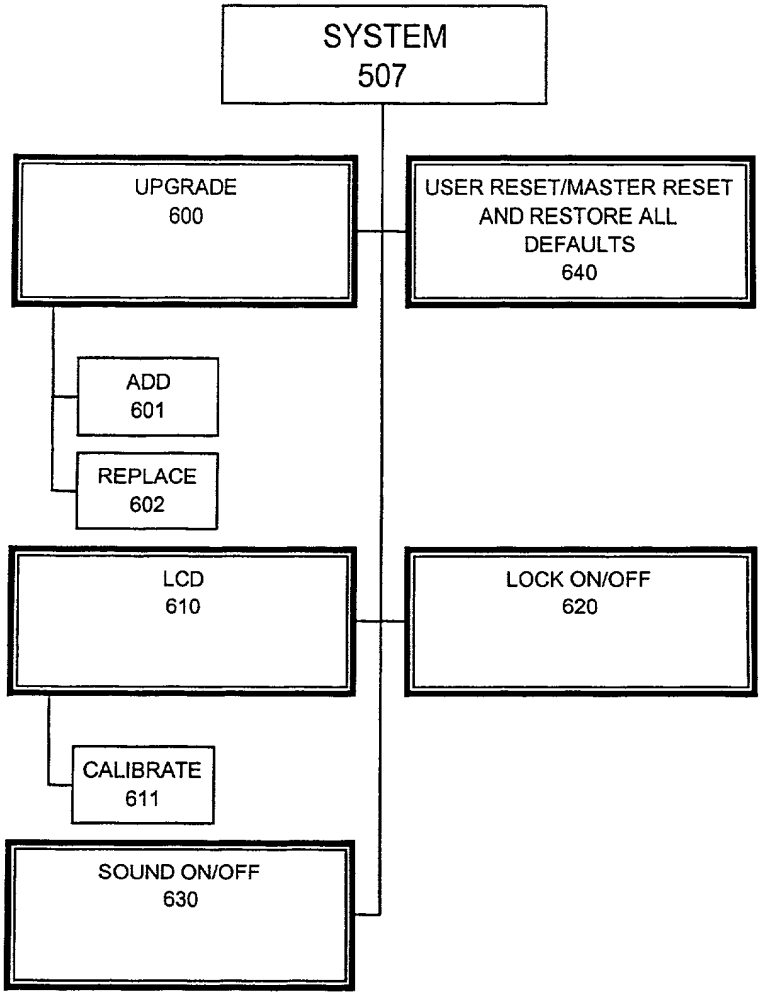

SYSTEM
507
UPGRADE
600
USER RESET/MASTER RESET
AND RESTORE ALL
DEFAULTS
640
ADD
601
REPLACE
602
LCD
610
LOCK ON/OFF
620
CALIBRATE
611
SOUND ON/OFF
630

Figure 8

Figure 9

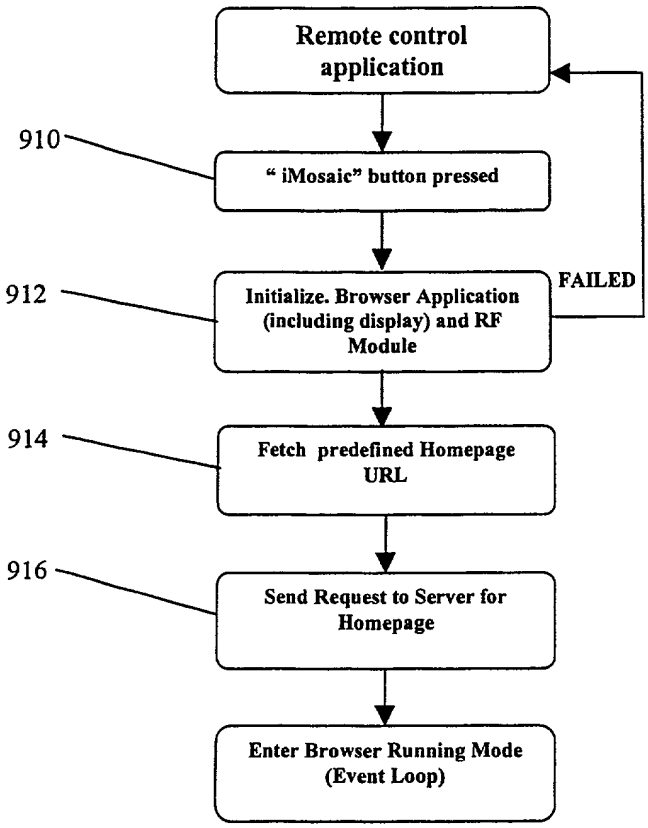

Remote control application
910
" iMosaic" button pressed
912
Initialize. Browser Application (including display) and RF Module
FAILED
914
Fetch predefined Homepage URL
916
Send Request to Server for Homepage
Enter Browser Running Mode (Event Loop)

FIGURE 10a

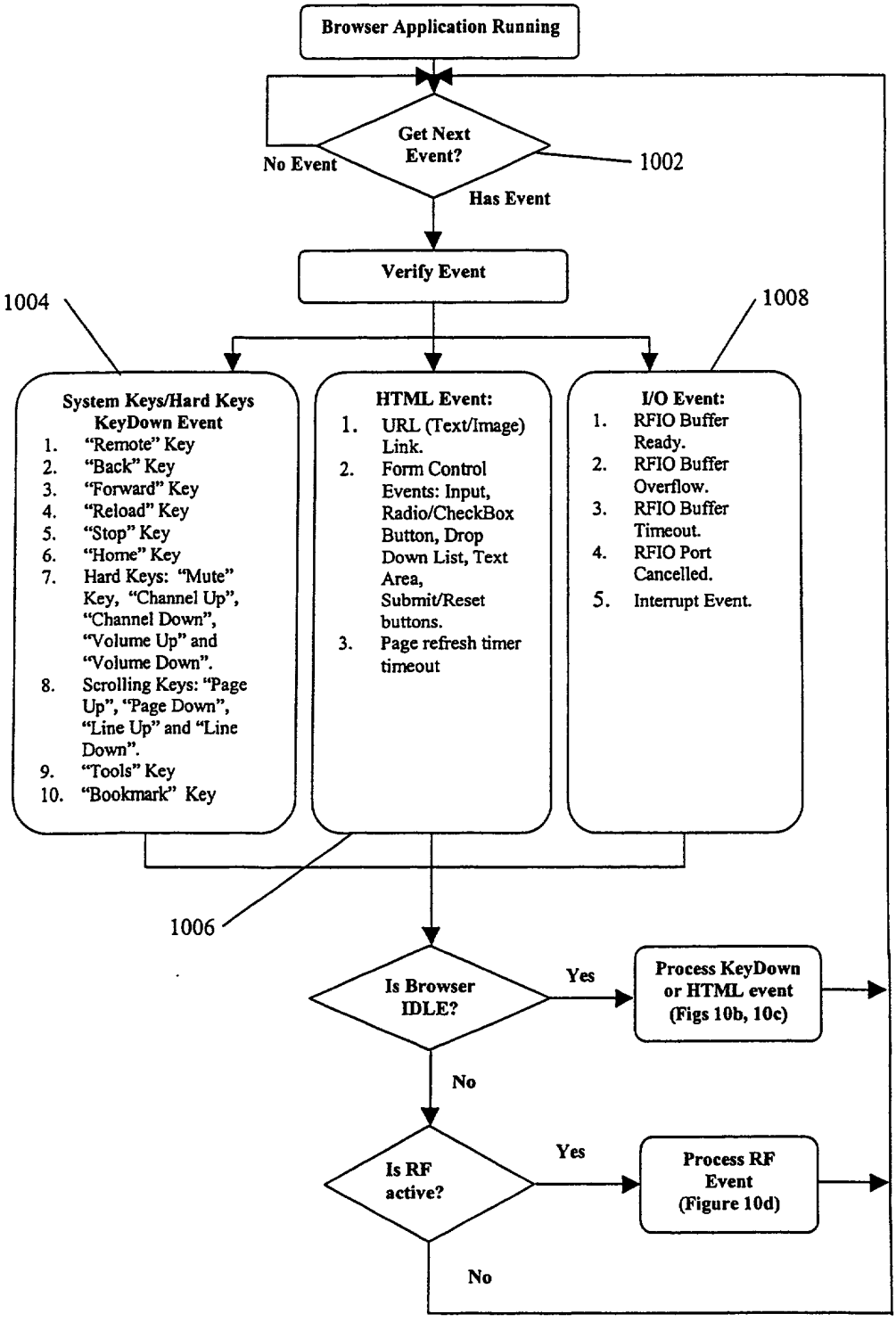

Browser Application Running
Get Next Event?
No Event
1002
Has Event
Verify Event
1004
1008
System Keys/Hard Keys KeyDown Event
1. "Remote" Key
2. "Back" Key
3. "Forward" Key
4. "Reload" Key
5. "Stop" Key
6. "Home" Key
7. Hard Keys: "Mute" Key, "Channel Up", "Channel Down", "Volume Up" and "Volume Down".
8. Scrolling Keys: "Page Up", "Page Down", "Line Up" and "Line Down".
9. "Tools" Key
10. "Bookmark" Key
HTML Event:
1. URL (Text/Image) Link.
2. Form Control Events: Input, Radio/CheckBox Button, Drop Down List, Text Area, Submit/Reset buttons.
3. Page refresh timer timeout
I/O Event:
1. RFIO Buffer Ready.
2. RFIO Buffer Overflow.
3. RFIO Buffer Timeout.
4. RFIO Port Cancelled.
5. Interrupt Event.
1006
Is Browser IDLE?
Yes
Process KeyDown or HTML event (Figs 10b, 10c)
No
Is RF active?
Yes
Process RF Event (Figure 10d)
No

Figure 10b

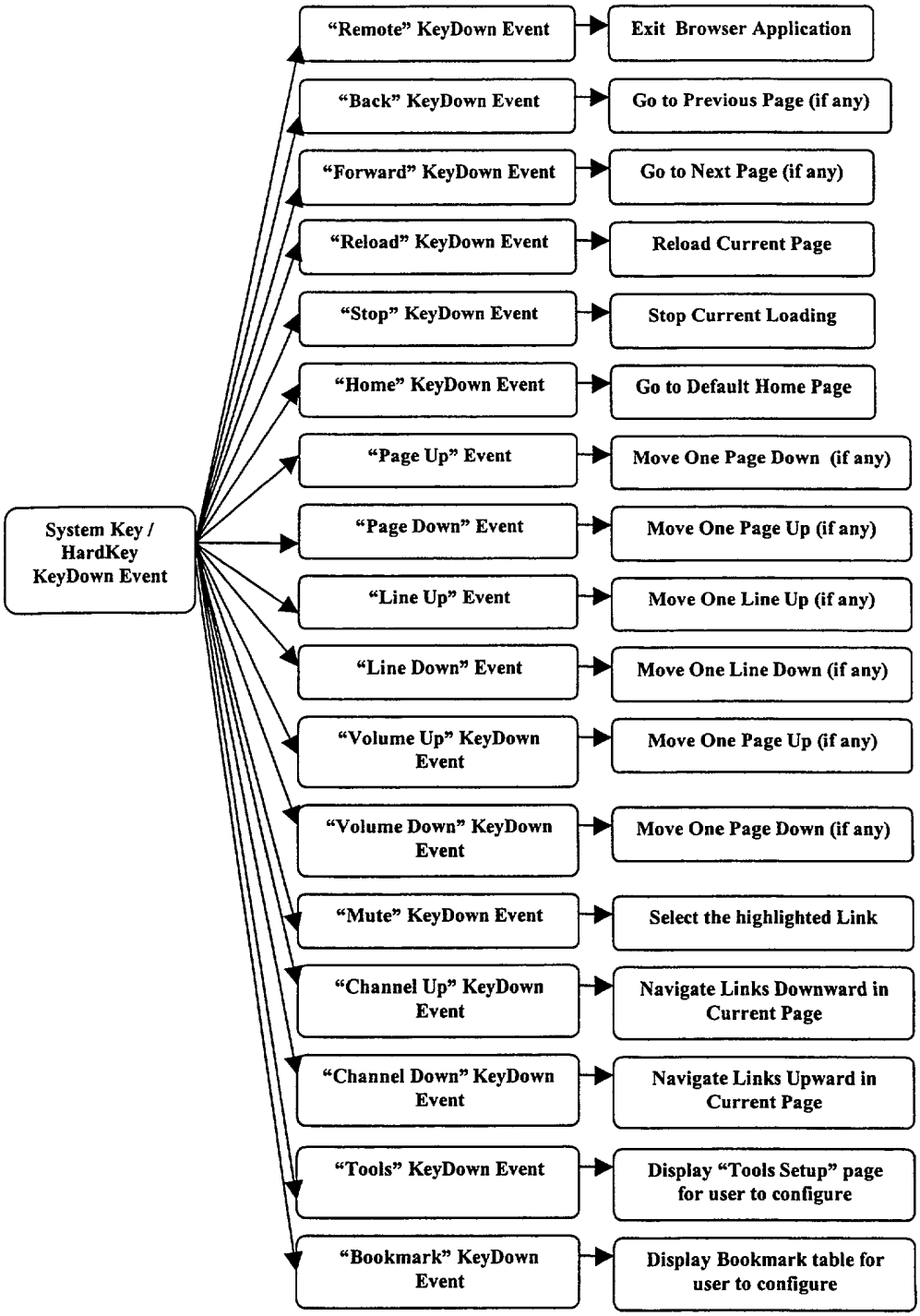

System Key / HardKey KeyDown Event
"Remote" KeyDown Event
Exit Browser Application
"Back" KeyDown Event
Go to Previous Page (if any)
"Forward" KeyDown Event
Go to Next Page (if any)
"Reload" KeyDown Event
Reload Current Page
"Stop" KeyDown Event
Stop Current Loading
"Home" KeyDown Event
Go to Default Home Page
"Page Up" Event
Move One Page Down (if any)
"Page Down" Event
Move One Page Up (if any)
"Line Up" Event
Move One Line Up (if any)
"Line Down" Event
Move One Line Down (if any)
"Volume Up" KeyDown Event
Move One Page Up (if any)
"Volume Down" KeyDown Event
Move One Page Down (if any)
"Mute" KeyDown Event
Select the highlighted Link
"Channel Up" KeyDown Event
Navigate Links Downward in Current Page
"Channel Down" KeyDown Event
Navigate Links Upward in Current Page
"Tools" KeyDown Event
Display "Tools Setup" page for user to configure
"Bookmark" KeyDown Event
Display Bookmark table for user to configure

Figure 10c

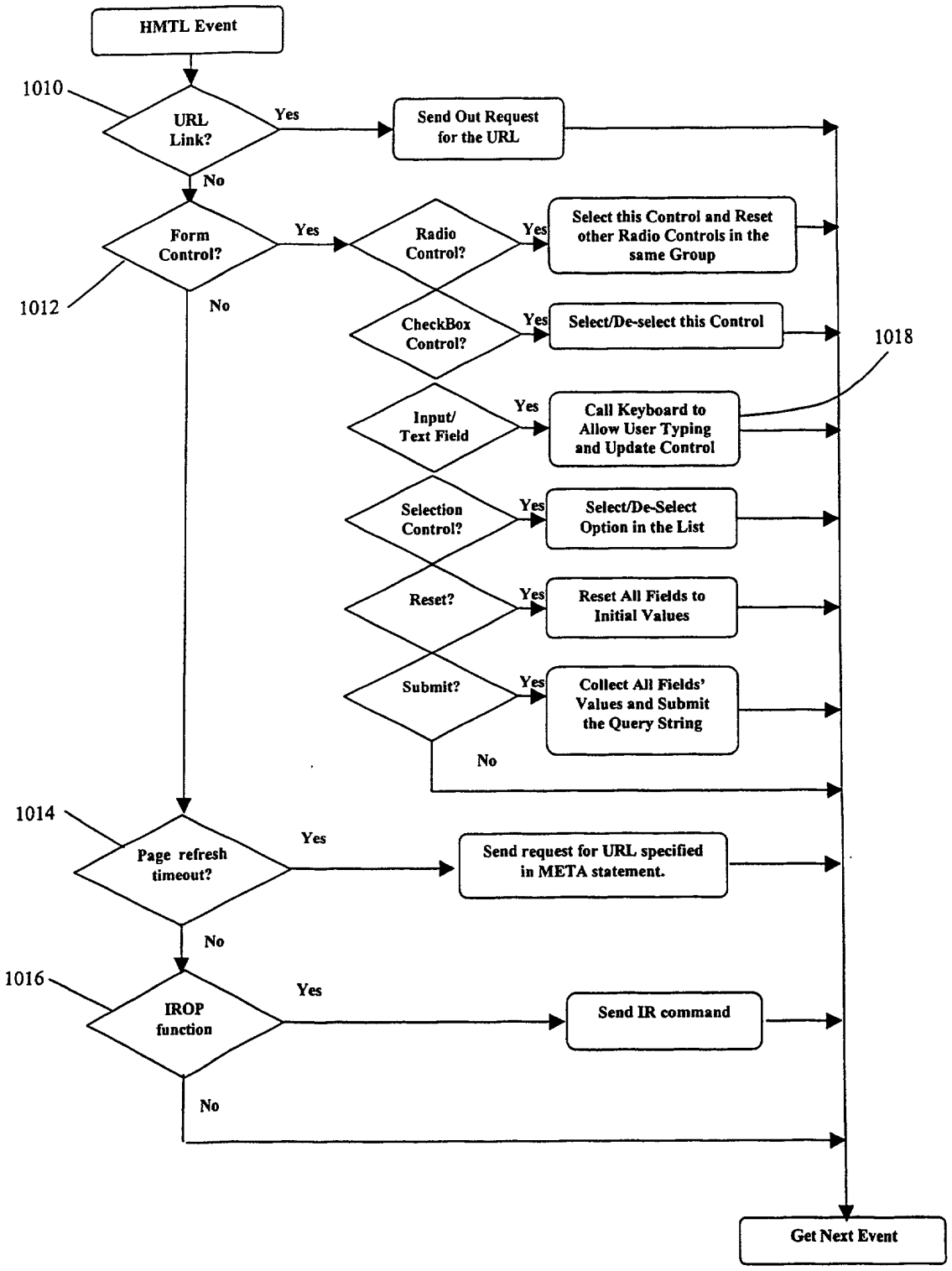

HMTL Event
1010
URL Link?
Yes
Send Out Request for the URL
No
Form Control?
Yes
Radio Control?
Yes
Select this Control and Reset other Radio Controls in the same Group
1012
No
CheckBox Control?
Yes
Select/De-select this Control
1018
Input/ Text Field
Yes
Call Keyboard to Allow User Typing and Update Control
Selection Control?
Yes
Select/De-Select Option in the List
Reset?
Yes
Reset All Fields to Initial Values
Submit?
Yes
Collect All Fields' Values and Submit the Query String
No
1014
Page refresh timeout?
Yes
Send request for URL specified in META statement.
No
1016
IROP function
Yes
Send IR command
No
Get Next Event

Figure 10d

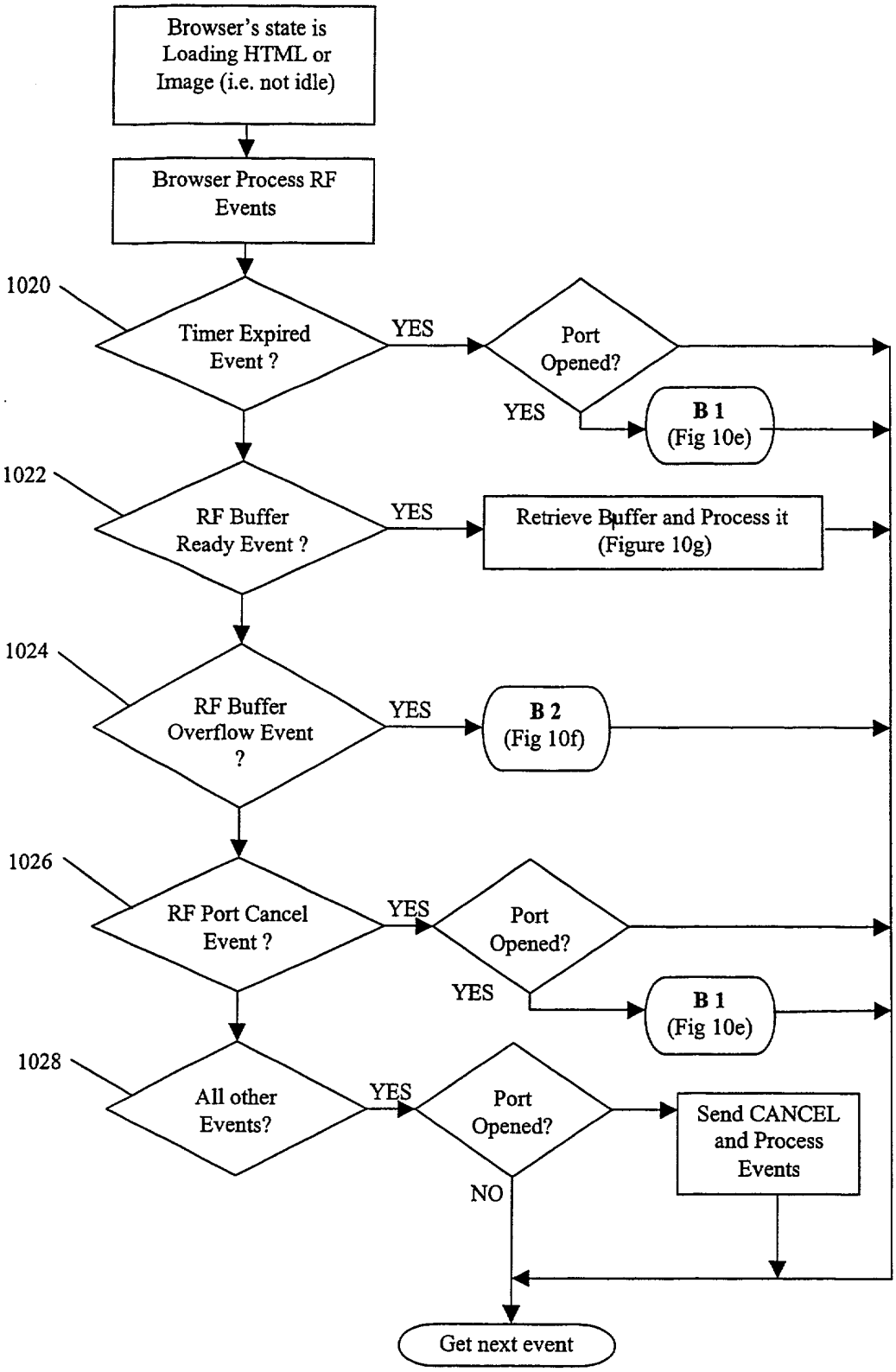

Browser's state is Loading HTML or Image (i.e. not idle)
Browser Process RF Events
1020
Timer Expired Event ?
YES
Port Opened?
YES
B 1 (Fig 10e)
1022
RF Buffer Ready Event ?
YES
Retrieve Buffer and Process it (Figure 10g)
1024
RF Buffer Overflow Event ?
YES
B 2 (Fig 10f)
1026
RF Port Cancel Event ?
YES
Port Opened?
YES
B 1 (Fig 10e)
1028
All other Events?
YES
Port Opened?
Send CANCEL and Process Events
NO
Get next event

Figure 10e

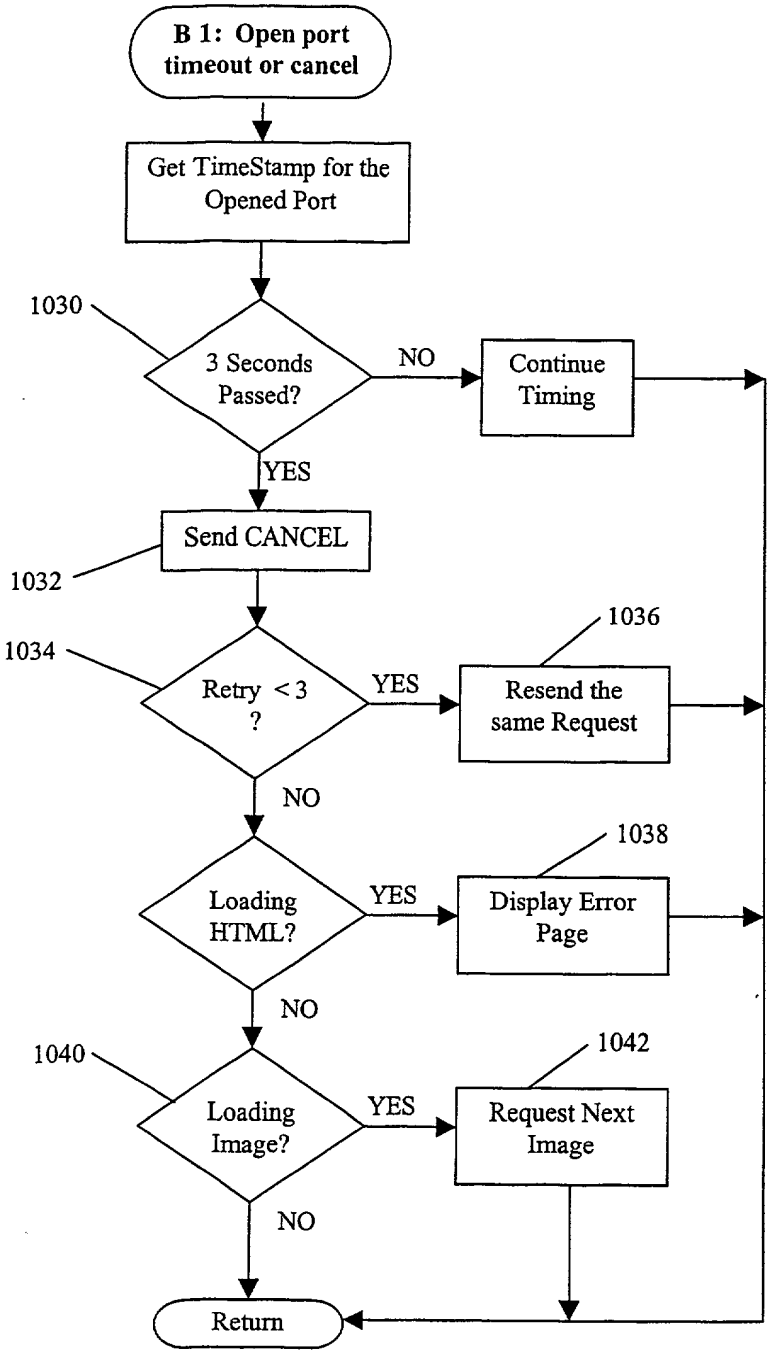

B 1: Open port timeout or cancel
Get TimeStamp for the Opened Port
1030
3 Seconds Passed?
NO
Continue Timing
YES
Send CANCEL
1032
1034
Retry < 3 ?
YES
1036
Resend the same Request
NO
Loading HTML?
YES
1038
Display Error Page
NO
1040
Loading Image?
YES
1042
Request Next Image
NO
Return

Figure 10f

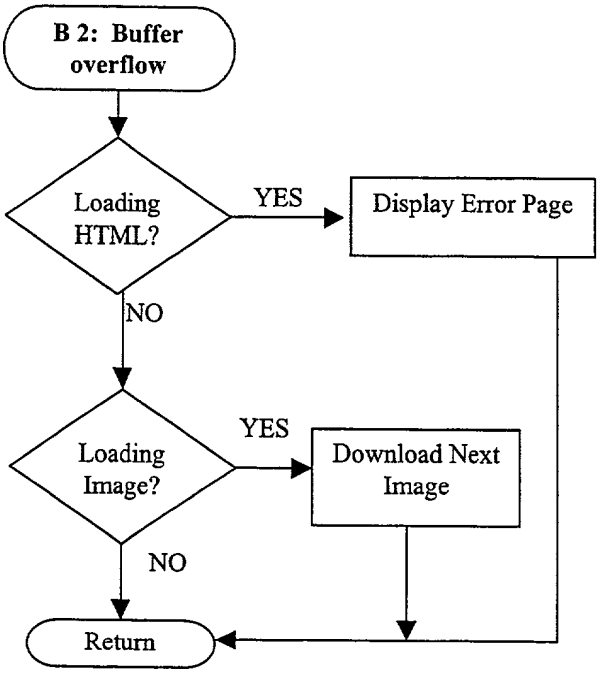
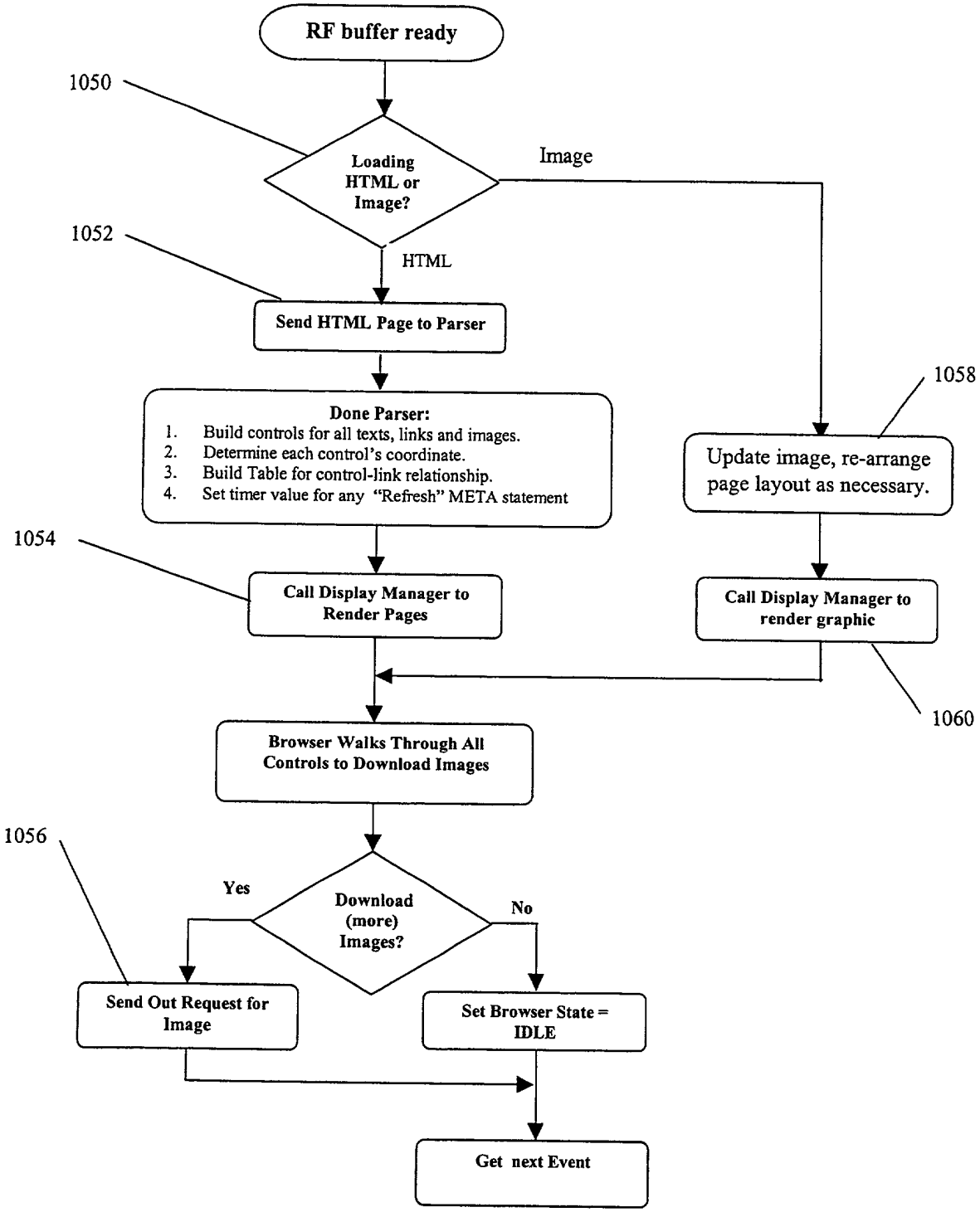

B 2: Buffer overflow
Loading HTML?
YES
Display Error Page
NO
Loading Image?
YES
Download Next Image
NO
Return

Figure 10g


RF buffer ready
1050
Loading HTML or Image?
Image
1052
HTML
Send HTML Page to Parser
1058
Done Parser:
1. Build controls for all texts, links and images.
2. Determine each control's coordinate.
3. Build Table for control-link relationship.
4. Set timer value for any "Refresh" META statement
Update image, re-arrange page layout as necessary.
1054
Call Display Manager to Render Pages
Call Display Manager to render graphic
1060
Browser Walks Through All Controls to Download Images
1056
Yes
Download (more) Images?
No
Send Out Request for Image
Set Browser State = IDLE
Get next Event

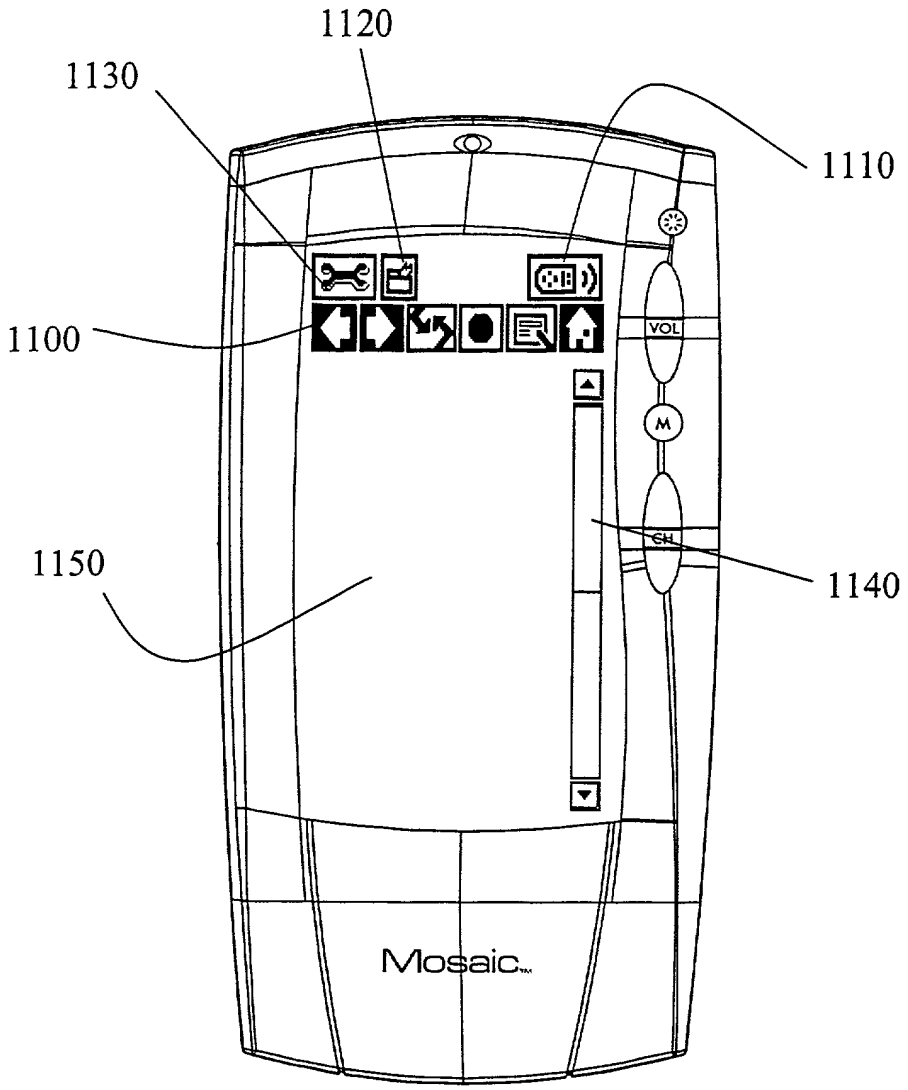
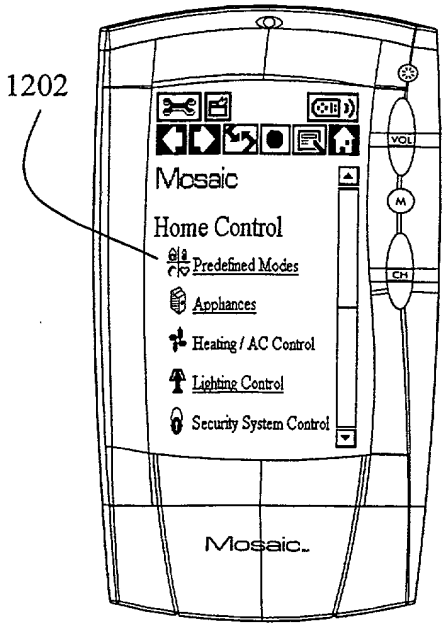
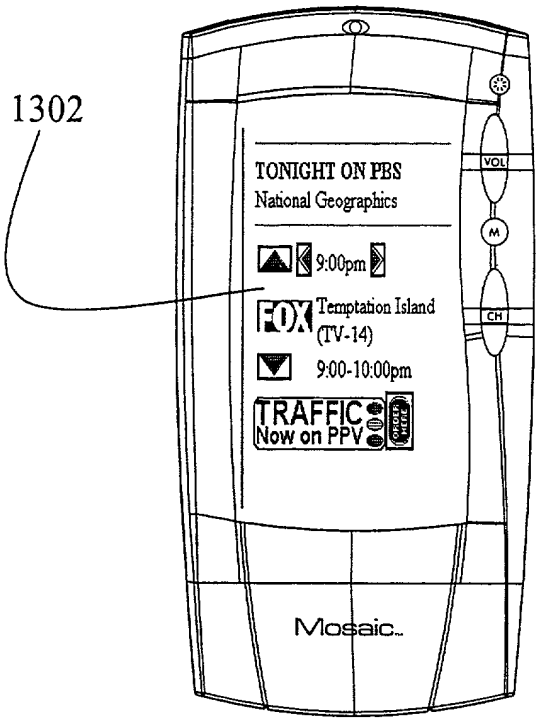


Figure 11




```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML><HEAD><TITLE>Home Manager</TITLE>
<META content="text/html; charset=windows-1252" http-equiv=Content-Type>
<META content="MSHTML 5.00.3207.2500" name=GENERATOR></HEAD>
<BODY leftMargin=0 link=#000000 text=#000000 topMargin=0 #000000?
marginheight="0" marginwidth="0"><A
href="index.htm"><IMG border=0 height=30
src="index_files/mosaic.gif" width=62></A> <BR><FONT
size=+2>Home Control</FONT>(tm)
<TABLE border=0 cellSpacing=1>
 <TBODY>
 <TR>
  <TD width=10>
  <TD><A href="modes.htm"><IMG border=0
   height=25 src="index_files/modesgif" width=25></A> </TD>
  <TD><A href="modes.htm">Predefined Modes</A>
  </TD></TR>
 <TR>
  <TD width=10>
  <TD><A href="appliances.htm"><IMG border=0
   height=25 src="index_files/Appliancesgif" width=25></A> </TD>
  <TD><A href="appliances.htm">Appliances</A>
  </TD></TR>
 <TR>
  <TD width=10>
  <TD><A href="hvac.htm"><IMG border=0
   height=25 src="index_files/hvacgif" width=25></A> </TD>
  <TD>Heating / AC
   Control</TD></TR>
 <TR>
  <TD width=10>
  <TD><A href="lighting.htm"><IMG border=0
   height=25 src="index_files/lighting.gif" width=25></A> </TD>
  <TD><A href="lighting.htm">Lighting
   Control</A> </TD></TR>
 <TR>
  <TD width=10>
  <TD><A href="security.htm"><IMG border=0
   height=25 src="index_files/Securitygif" width=25></A> </TD>
  <TD>Security System
   Control</TD></TR></TBODY></TABLE></BODY></HTML>
```

Figure 12



1300

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML><HEAD><TITLE>Universal Electronics Inc.</TITLE>
<META content="text/html; charset=windows-1252" http-equiv=Content-Type>
<META name="Full Screen" content="Full_Screen">
<META content="MSHTML 5.00.3207.2500" name=GENERATOR></HEAD>
<BODY>
<hr>
    <b>TONIGHT ON PBS</b><br>
    National Geographics<hr>
    <table>
    <tr>
    <td>
    <a href="pbs.htm"><IMG alt="Up" src="up.gif" width=27 height=14></a>
    <td>
    <a href="fox8.htm"><IMG alt="left" src="left.gif" width=10 height=19></a>
    <td>9:00pm</td>
    <td>
    <a href="fox10.htm"><IMG alt="right" src="right.gif" width=10 height=19></a>
    </tr></table>
    <table>
    <tr><td>
    <IMG alt="fox" src="fox.gif" width=50 height=21>
    <td>Temptation Island<br>(TV-14)<br>
    </tr>
    <tr><td>
    <a href="abc.htm"><IMG alt="Down" src="down.gif" width=27 height=14></a>
    <td>9:00-10:00pm</tr>
    </table>
    <IMG alt="Traffic" src="traffic.gif"><a href="traffic.htm"><IMG alt="Order" src="orderhere.gif"></a>
</BODY></HTML>
```

Figure 13

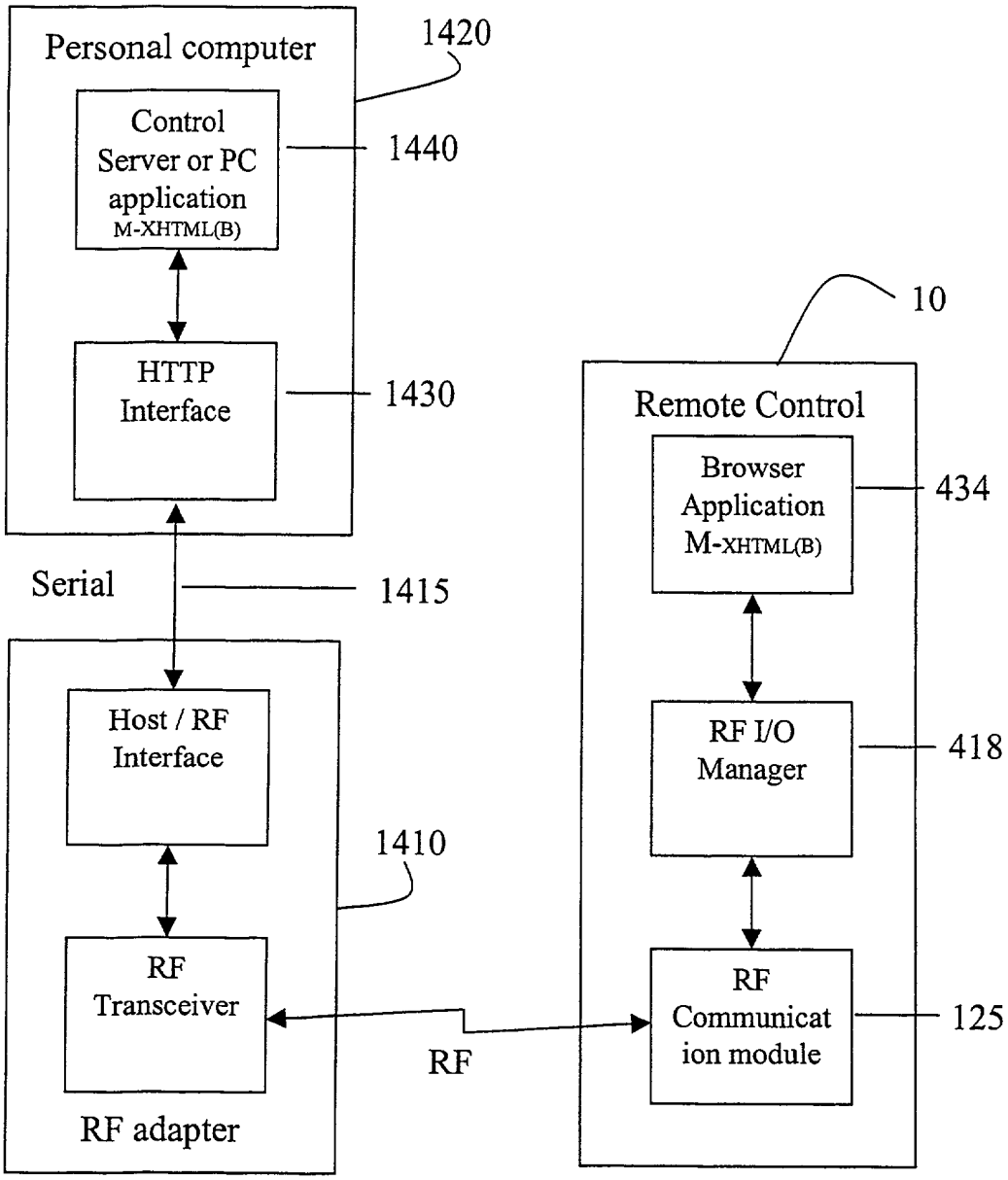

Personal computer
1420
Control Server or PC application M-XHTML(B)
1440
HTTP Interface
1430
Serial
1415
Host / RF Interface
1410
RF Transceiver
RF adapter
RF
10
Remote Control
Browser Application M-XHTML(B)
434
RF I/O Manager
418
RF Communicat ion module
125

Figure 14

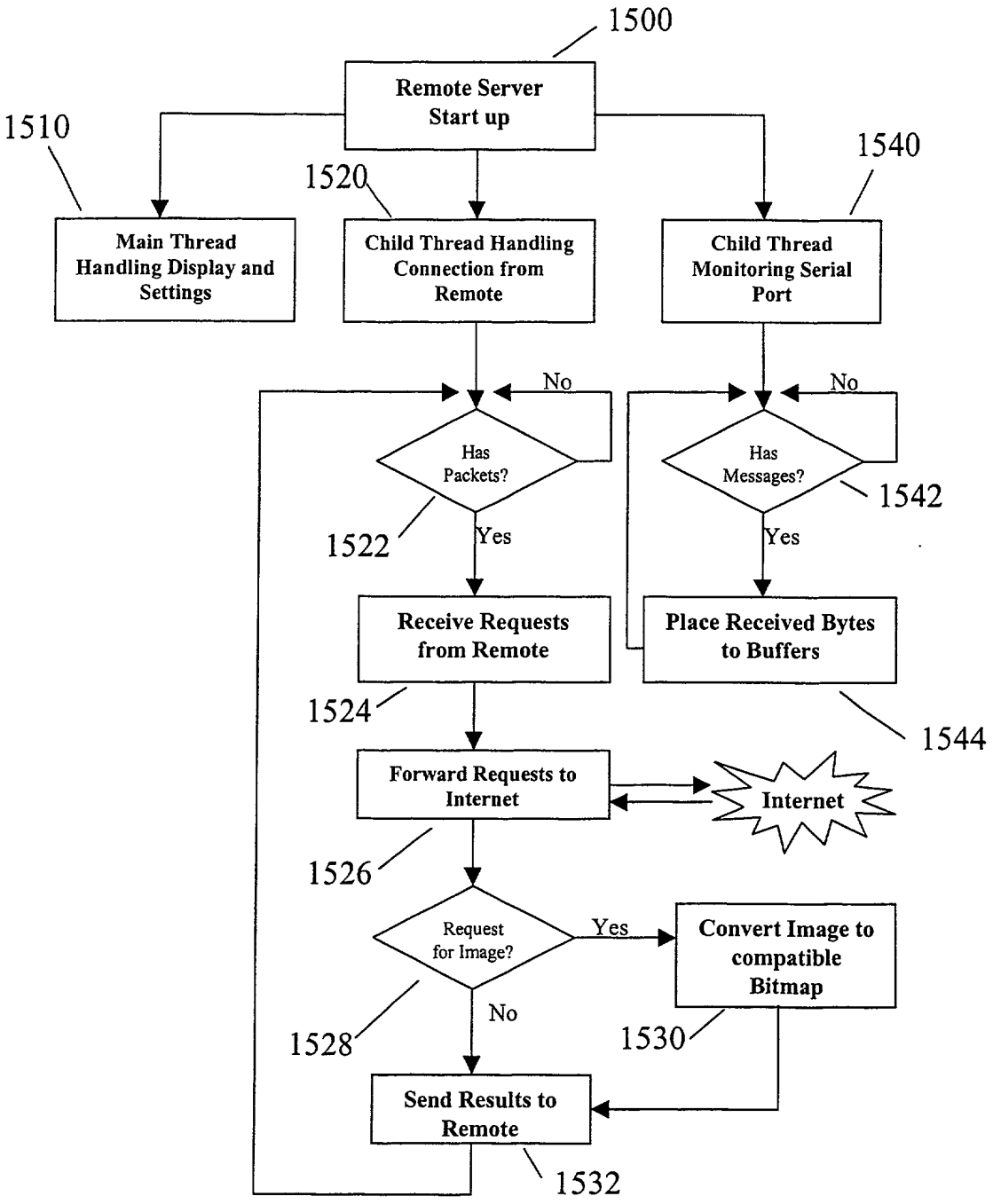

1500
Remote Server Start up
1510
1520
1540
Main Thread Handling Display and Settings
Child Thread Handling Connection from Remote
Child Thread Monitoring Serial Port
No
No
Has Packets?
Has Messages?
1542
1522
Yes
Yes
Receive Requests from Remote
Place Received Bytes to Buffers
1524
1544
Forward Requests to Internet
Internet
1526
Request for Image?
Yes
Convert Image to compatible Bitmap
No
1528
1530
Send Results to Remote
1532

Figure 15

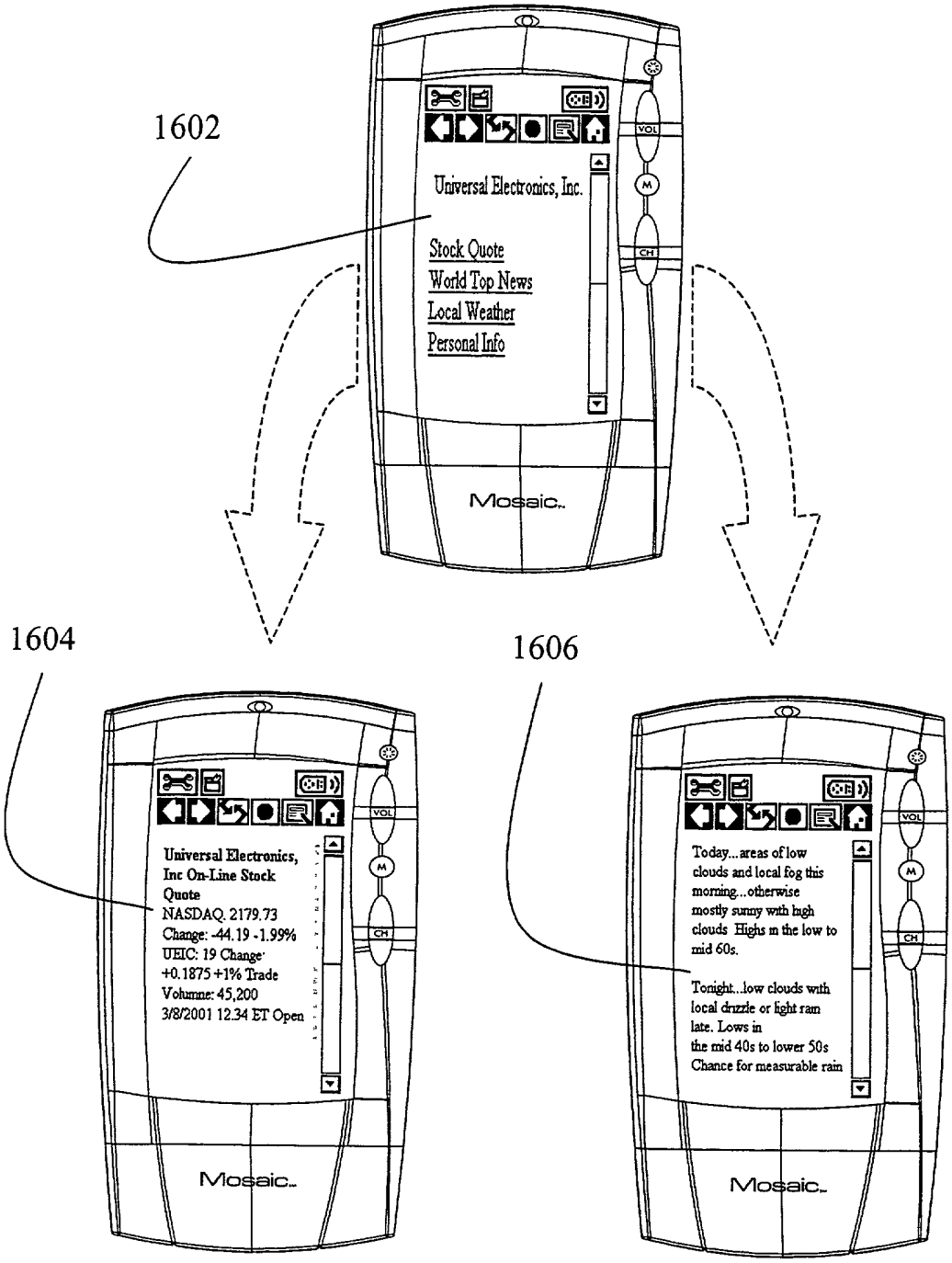

1602
Universal Electronics, Inc.
Stock Quote
World Top News
Local Weather
Personal Info
Mosaic
1604
Universal Electronics, Inc On-Line Stock Quote
NASDAQ 2179.73
Change: -44.19 -1.99%
UEIC: 19 Change
+0.1875 +1% Trade
Volumne: 45,200
3/8/2001 12.34 ET Open
Mosaic
1606
Today...areas of low clouds and local fog this morning...otherwise mostly sunny with high clouds Highs in the low to mid 60s.
Tonight...low clouds with local drizzle or light rain late. Lows in the mid 40s to lower 50s Chance for measurable rain
Mosaic

Figure 16

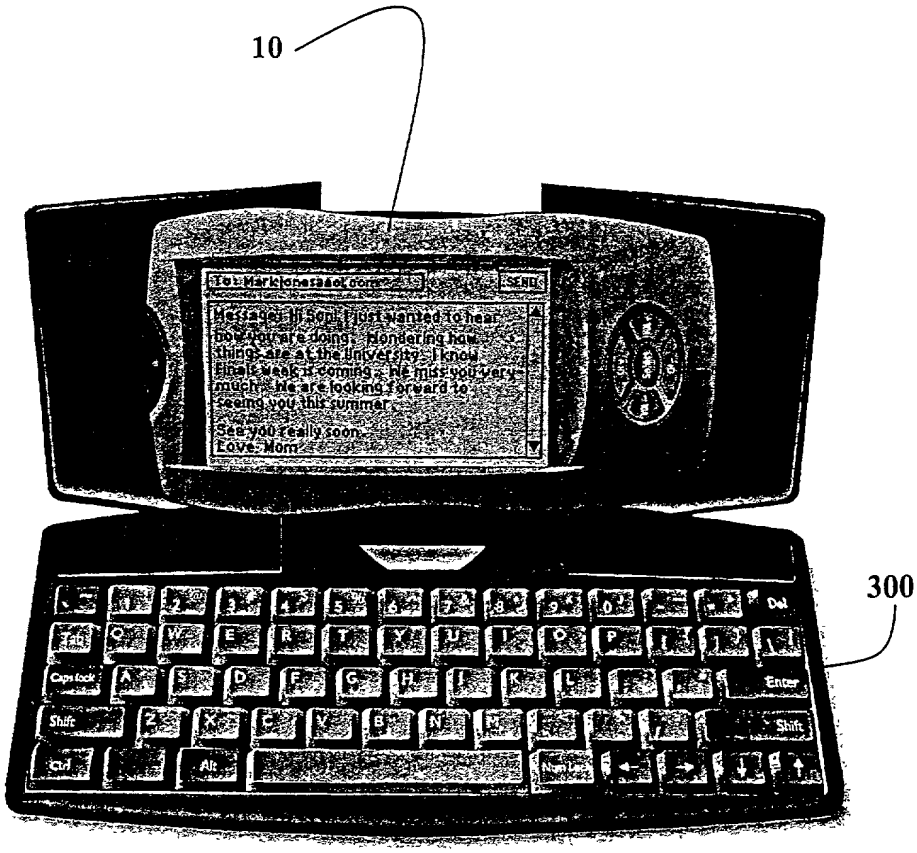

10
300
To: Marie Jones at Home
SEND
Marianne: Hi Sonja! Just wanted to hear how you are doing. Wondering how things are at the University. I know Brian was in coming. We miss you very much. We are looking forward to seeing you this summer.
See you really soon.
Love, Mom

Figure 17

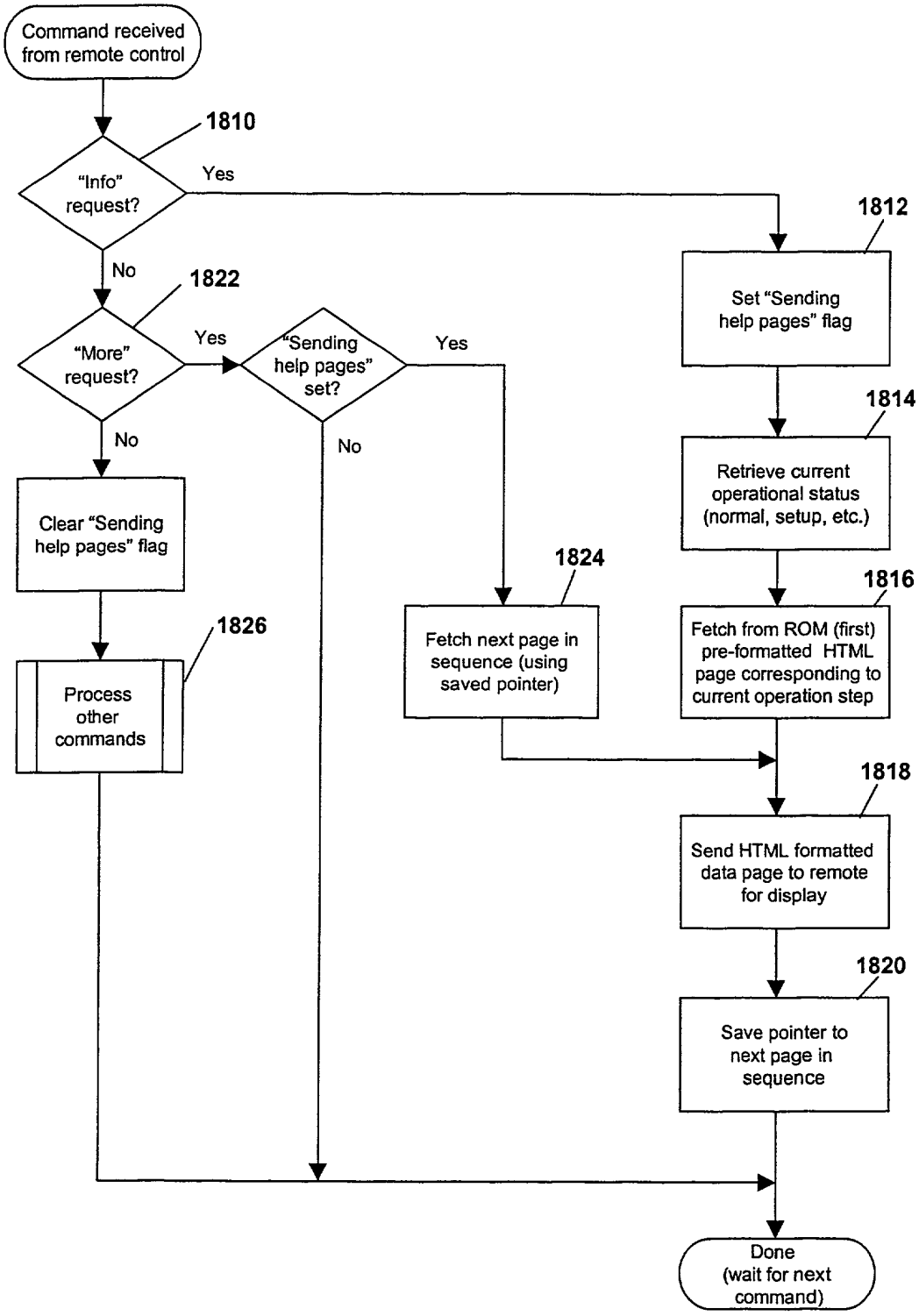

Command received from remote control
1810
"Info" request?
Yes
1812
Set "Sending help pages" flag
No
1822
"More" request?
Yes
"Sending help pages" set?
Yes
No
1814
Retrieve current operational status (normal, setup, etc.)
No
Clear "Sending help pages" flag
1824
1816
Fetch next page in sequence (using saved pointer)
Fetch from ROM (first) pre-formatted HTML page corresponding to current operation step
1826
Process other commands
1818
Send HTML formatted data page to remote for display
1820
Save pointer to next page in sequence
Done (wait for next command)

Figure 18(a)

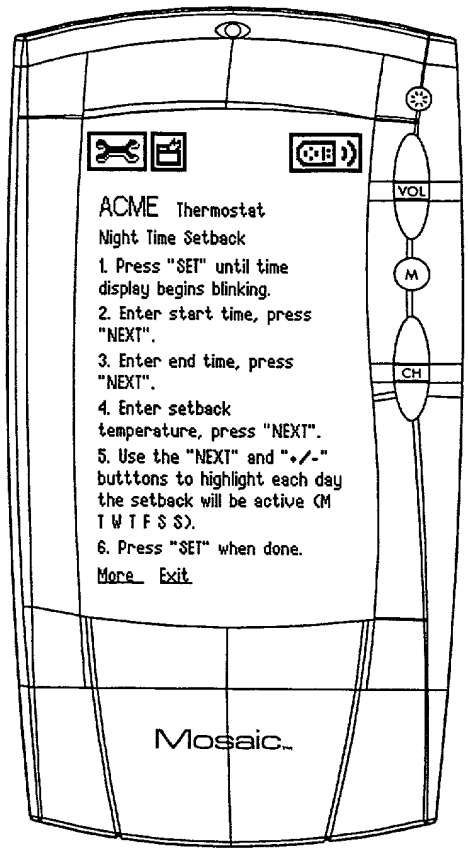

ACME Thermostat
Night Time Setback
1. Press "SET" until time display begins blinking.
2. Enter start time, press "NEXT".
3. Enter end time, press "NEXT".
4. Enter setback temperature, press "NEXT".
5. Use the "NEXT" and "+/-" butttons to highlight each day the setback will be active (M T W T F S S).
6. Press "SET" when done.
More Exit
VOL
M
CH
Mosaic

Figure 18(b).

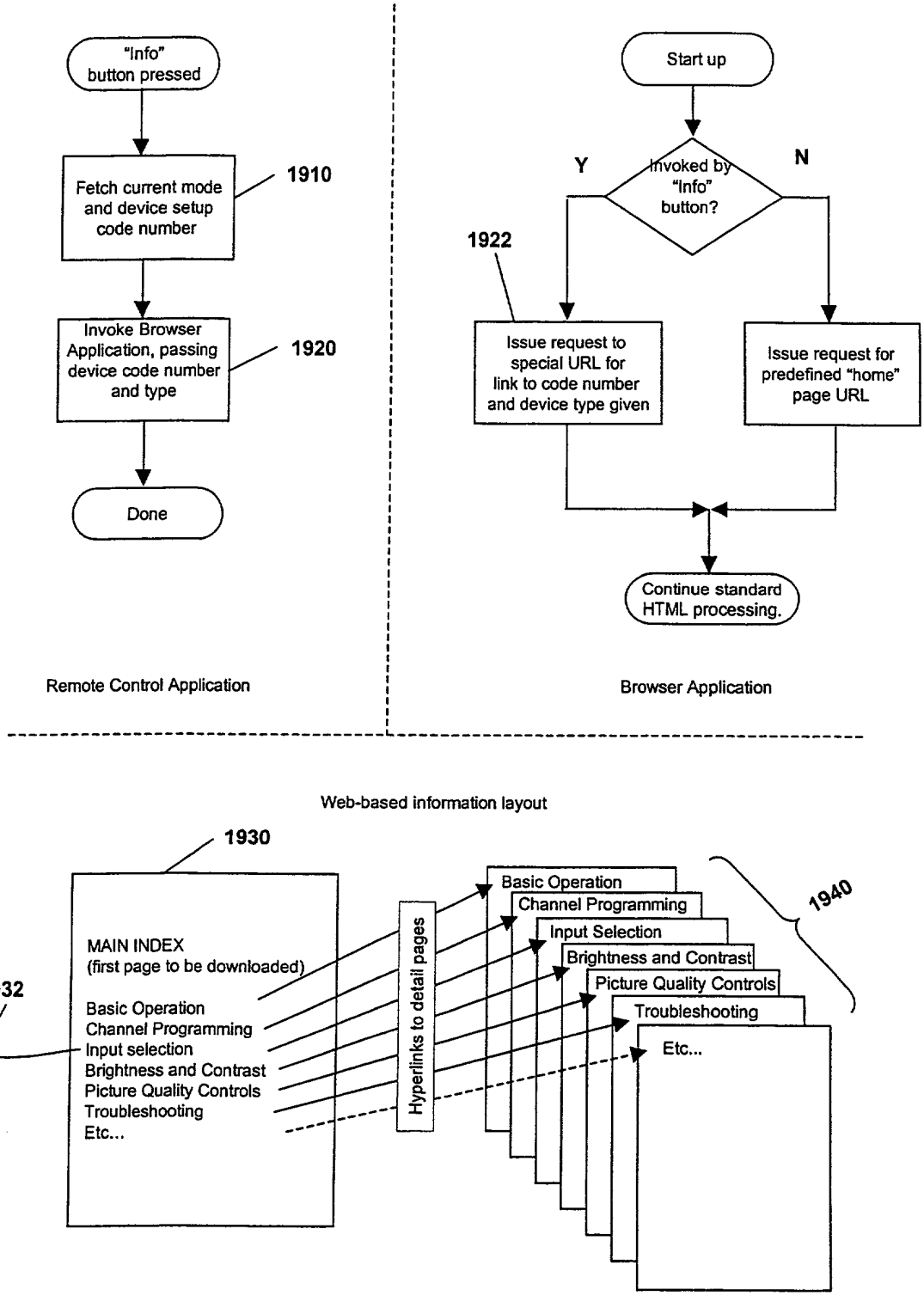

"Info" button pressed
Fetch current mode and device setup code number
1910
Invoke Browser Application, passing device code number and type
1920
Done
Remote Control Application
Start up
Invoked by "Info" button?
Y
N
1922
Issue request to special URL for link to code number and device type given
Issue request for predefined "home" page URL
Continue standard HTML processing.
Browser Application
Web-based information layout
1930
MAIN INDEX
(first page to be downloaded)
1932
Basic Operation
Channel Programming
Input selection
Brightness and Contrast
Picture Quality Controls
Troubleshooting
Etc...
Hyperlinks to detail pages
Basic Operation
Channel Programming
Input Selection
Brightness and Contrast
Picture Quality Controls
Troubleshooting
Etc...
1940

Figure 19(a)

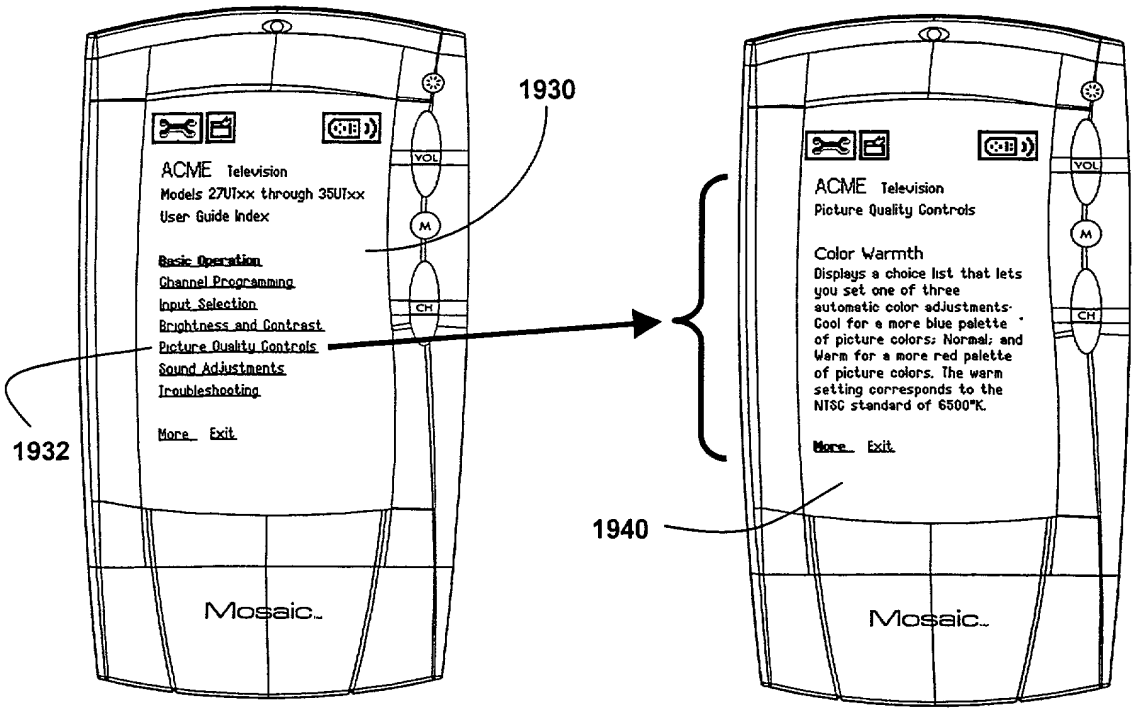

1930
1932
1940
ACME Television
Models 27UTxx through 35UTxx
User Guide Index
Basic Operation
Channel Programming
Input Selection
Brightness and Contrast
Picture Quality Controls
Sound Adjustments
Troubleshooting
More Exit
Mosaic
VOL
M
CH
ACME Television
Picture Quality Controls
Color Warmth
Displays a choice list that lets you set one of three automatic color adjustments: Cool for a more blue palette of picture colors; Normal; and Warm for a more red palette of picture colors. The warm setting corresponds to the NTSC standard of 6500°K.
More Exit
Mosaic
VOL
M
CH

Figure 19(b)

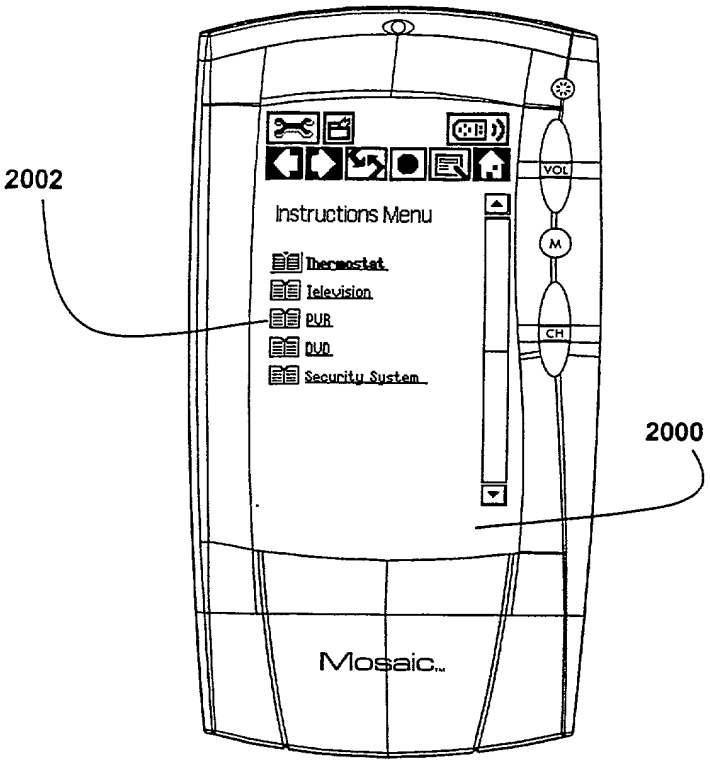

2002
2000
Instructions Menu
Thermostat
Television
PVR
DVD
Security System
VOL
M
CH
Mosaic...

Figure 20

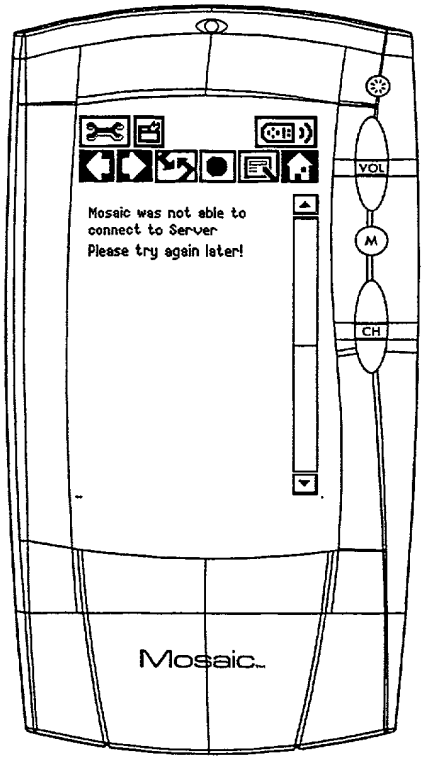

Mosaic was not able to
connect to Server
Please try again later!
VOL
M
CH
Mosaic

Figure 21

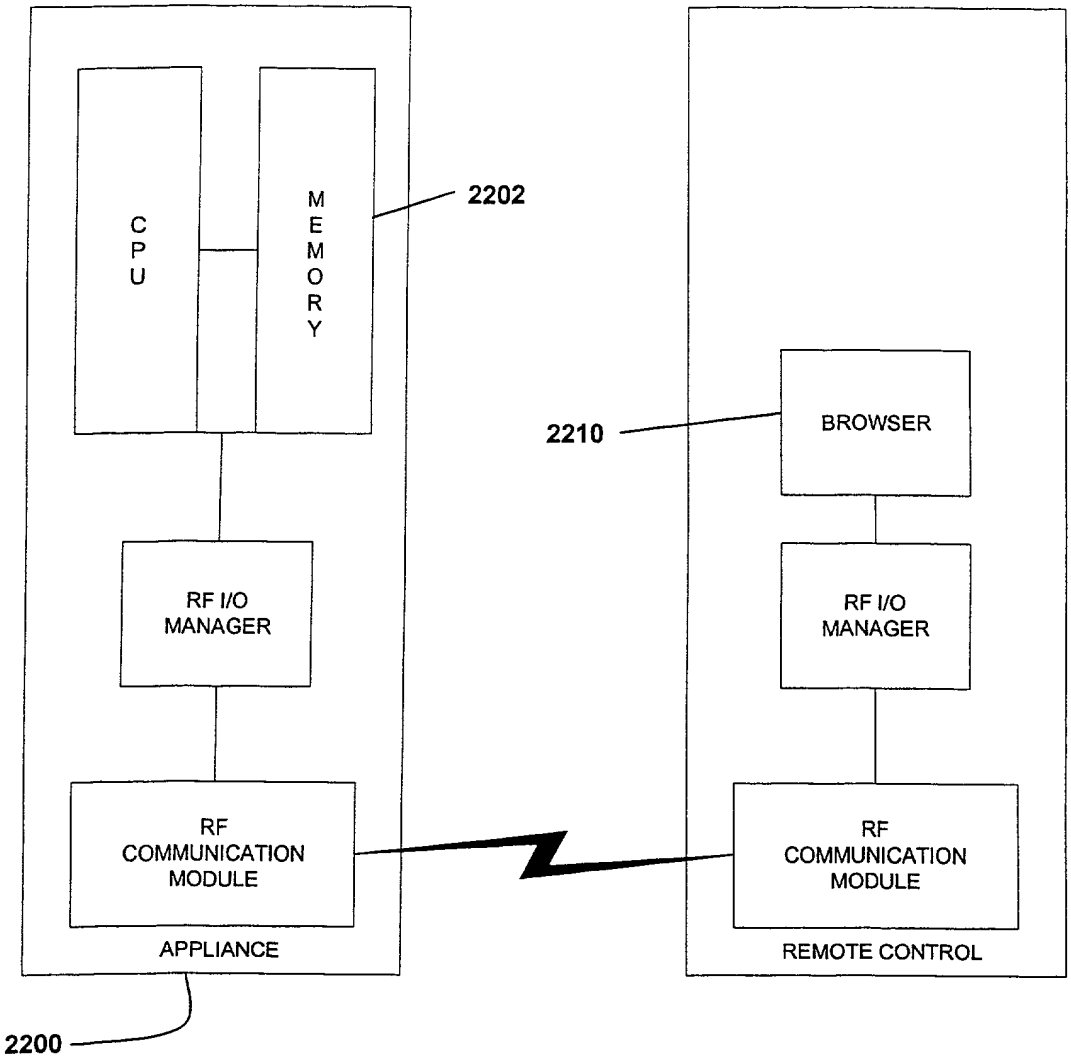

CPU
MEMORY
2202
RF I/O MANAGER
RF COMMUNICATION MODULE
APPLIANCE
2200
2210
BROWSER
RF I/O MANAGER
RF COMMUNICATION MODULE
REMOTE CONTROL

FIGURE 22

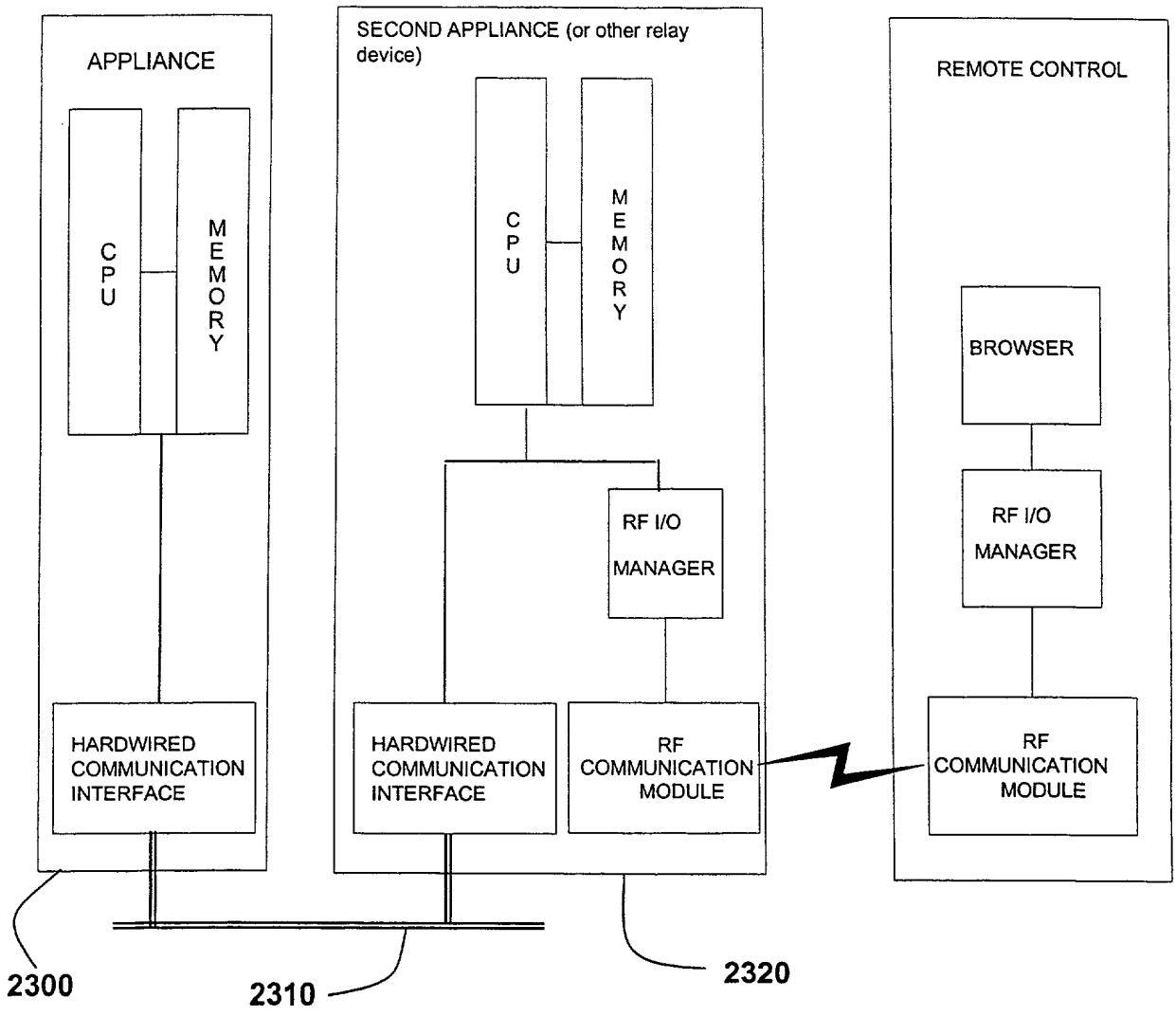

APPLIANCE
CPU
MEMORY
HARDWIRED COMMUNICATION INTERFACE
SECOND APPLIANCE (or other relay device)
CPU
MEMORY
RF I/O MANAGER
HARDWIRED COMMUNICATION INTERFACE
RF COMMUNICATION MODULE
REMOTE CONTROL
BROWSER
RF I/O MANAGER
RF COMMUNICATION MODULE
2300
2310
2320

FIGURE 23

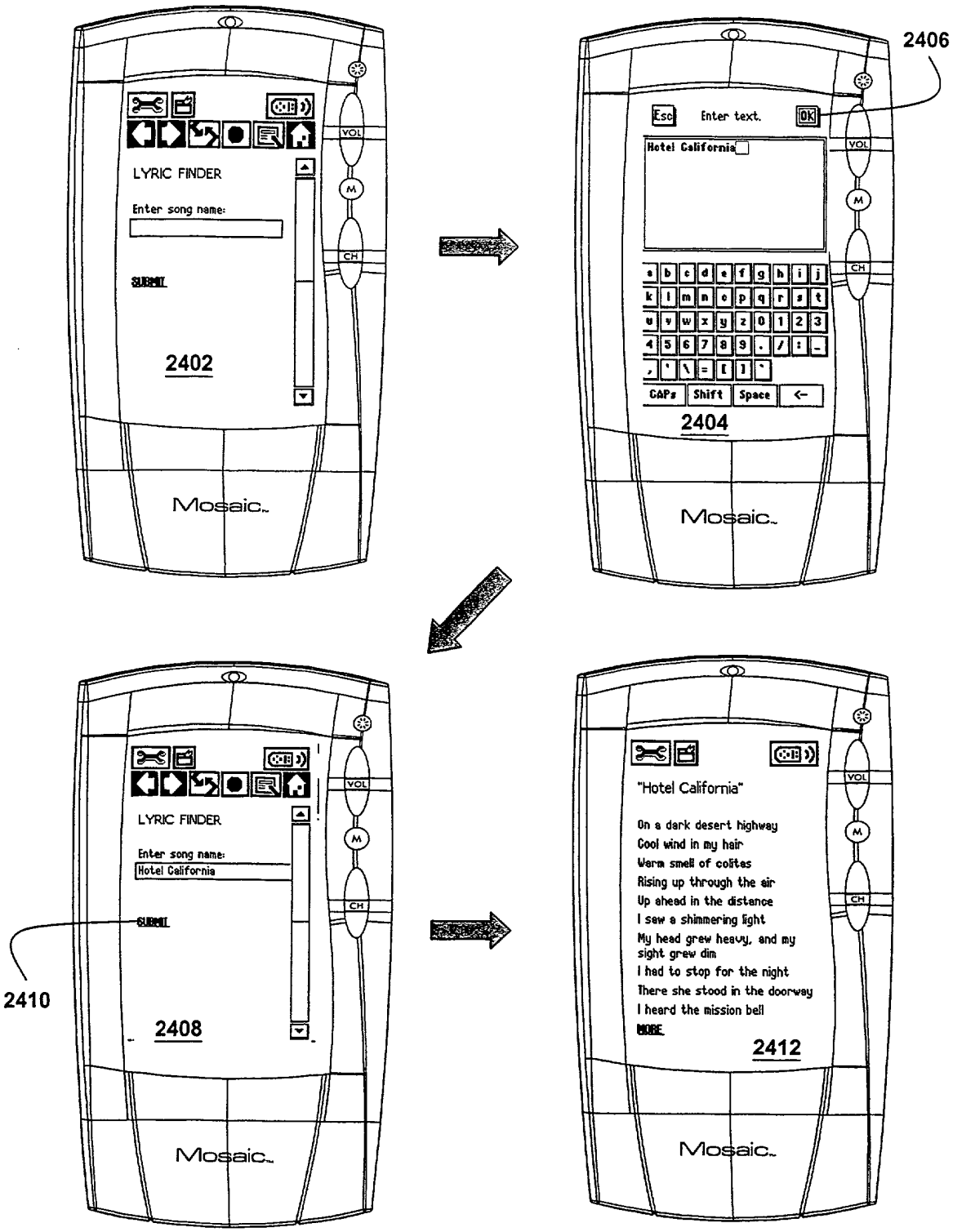

LYRIC FINDER
Enter song name:
SUBMIT
2402
Mosaic
2406
Esc
Enter text.
OK
Hotel California
CAPs
Shift
Space
2404
Mosaic
LYRIC FINDER
Enter song name:
Hotel California
SUBMIT
2410
2408
Mosaic
"Hotel California"
On a dark desert highway
Cool wind in my hair
Warm smell of colitas
Rising up through the air
Up ahead in the distance
I saw a shimmering light
My head grew heavy, and my sight grew dim
I had to stop for the night
There she stood in the doorway
I heard the mission bell
MORE
2412
Mosaic

Figure 24

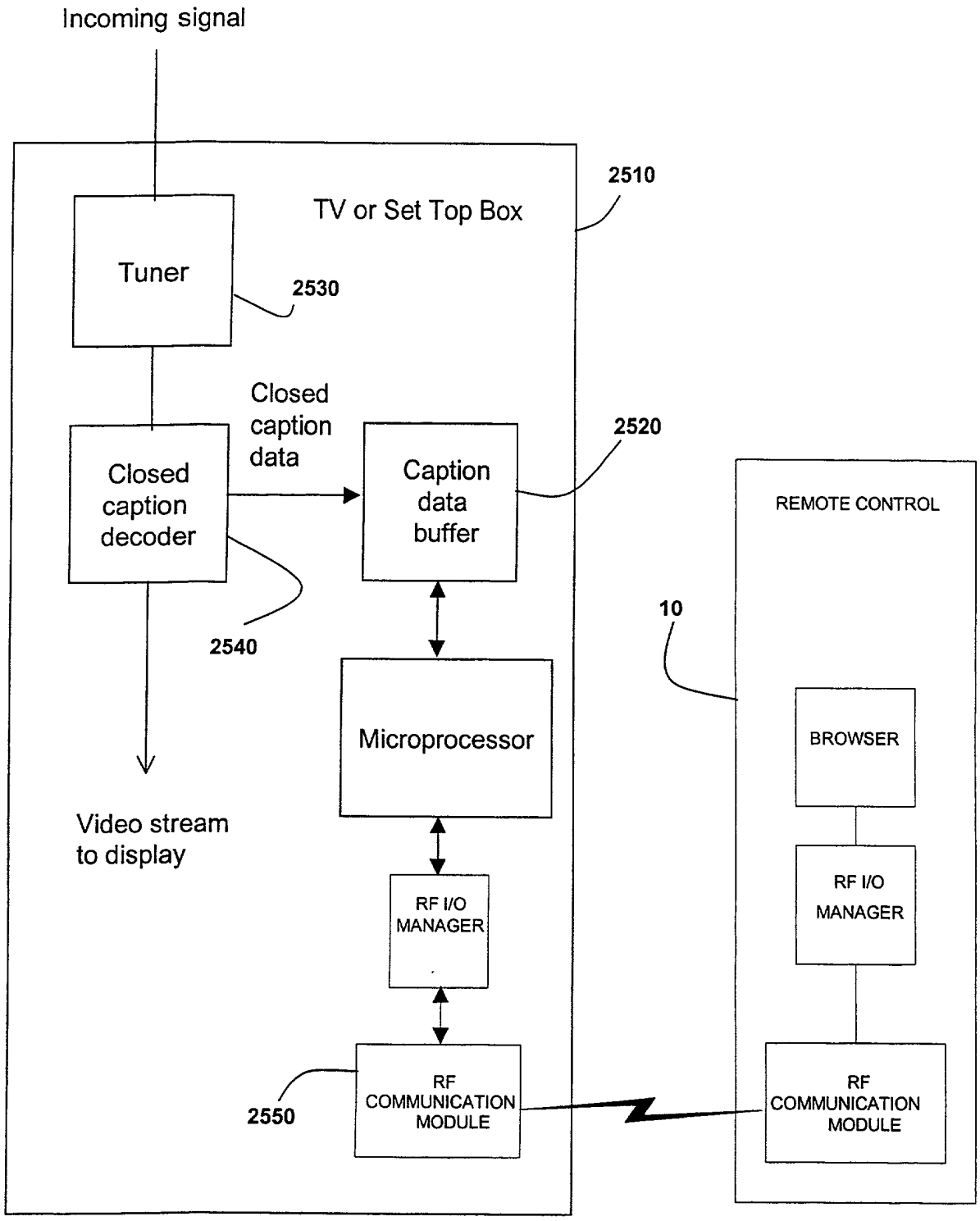

Incoming signal
TV or Set Top Box
2510
Tuner
2530
Closed caption data
Closed caption decoder
Caption data buffer
2520
2540
Microprocessor
Video stream to display
RF I/O MANAGER
RF COMMUNICATION MODULE
2550
REMOTE CONTROL
10
BROWSER
RF I/O MANAGER
RF COMMUNICATION MODULE

Figure 25

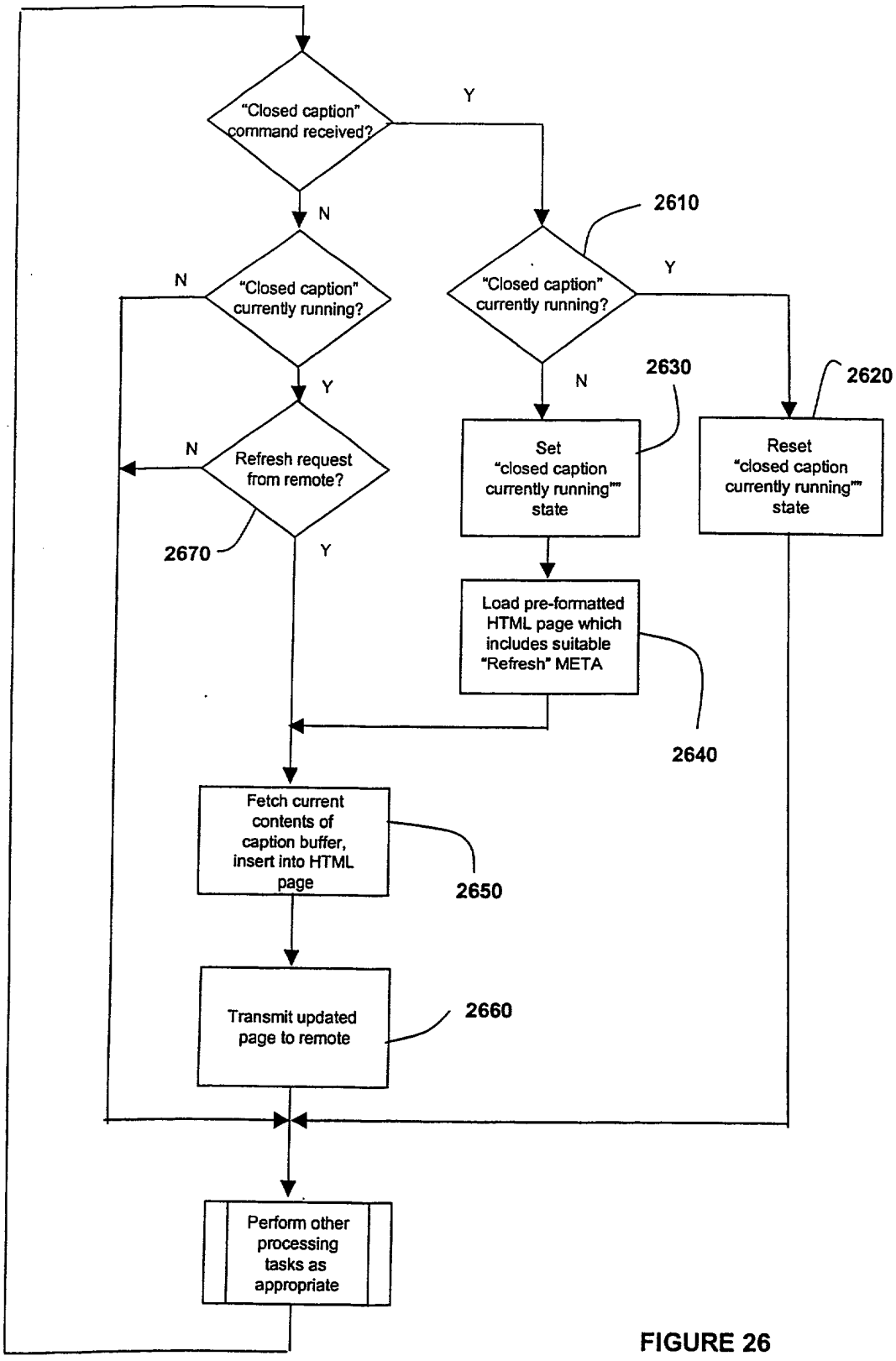

"Closed caption" command received?
Y
N
2610
"Closed caption" currently running?
Y
N
"Closed caption" currently running?
N
Y
2630
2620
Set "closed caption currently running"" state
Reset "closed caption currently running"" state
N
Refresh request from remote?
2670
Y
Load pre-formatted HTML page which includes suitable "Refresh" META
2640
Fetch current contents of caption buffer, insert into HTML page
2650
Transmit updated page to remote
2660
Perform other processing tasks as appropriate

FIGURE 26

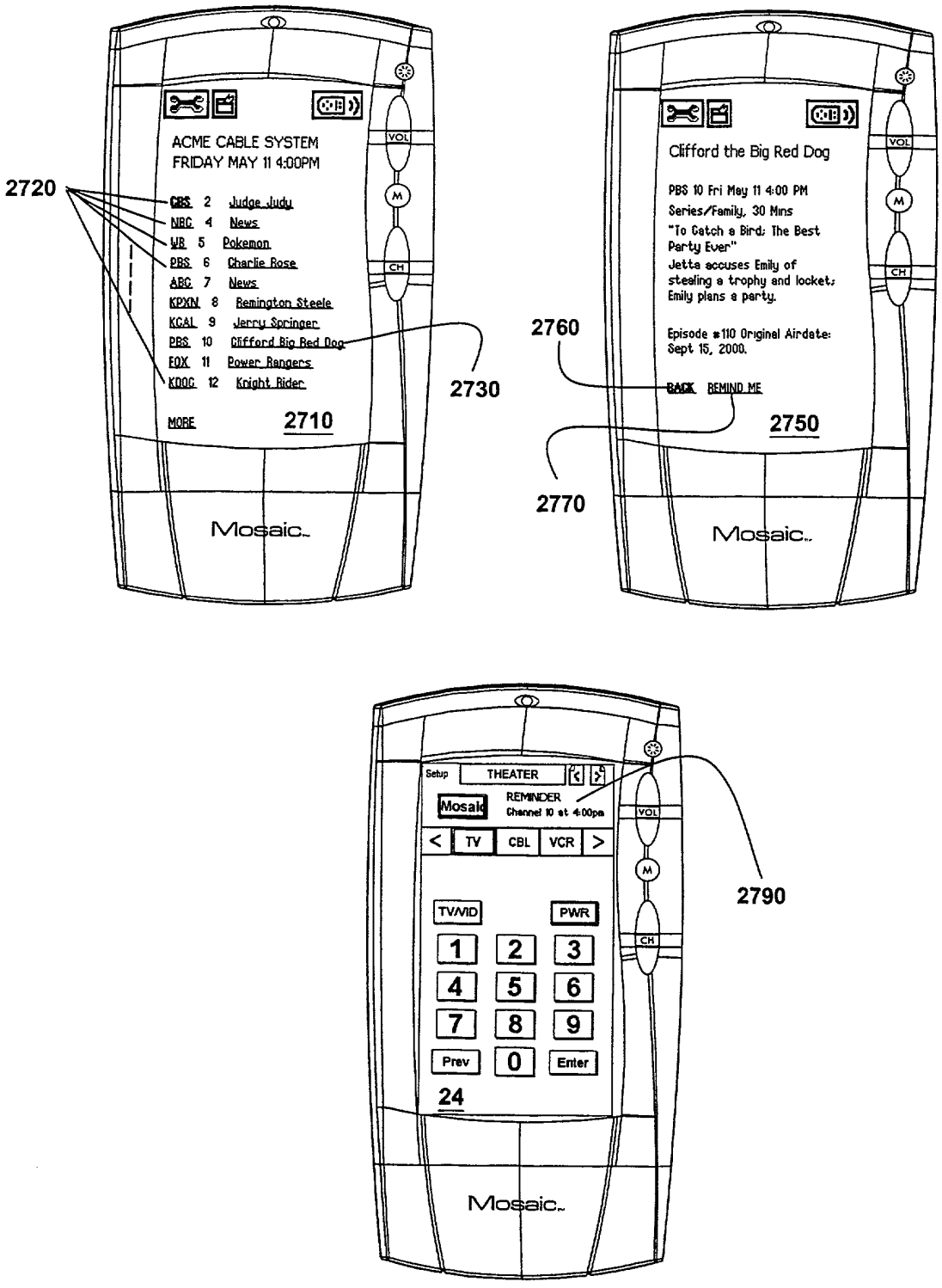

2720
ACME CABLE SYSTEM
FRIDAY MAY 11 4:00PM
CBS 2 Judge Judy
NBC 4 News
WB 5 Pokemon
PBS 6 Charlie Rose
ABC 7 News
KPXN 8 Remington Steele
KCAL 9 Jerry Springer
PBS 10 Clifford Big Red Dog
FOX 11 Power Rangers
KDOC 12 Knight Rider
MORE
2710
2730
Mosaic
Clifford the Big Red Dog
PBS 10 Fri May 11 4:00 PM
Series/Family, 30 Mins
"To Catch a Bird: The Best Party Ever"
Jetta accuses Emily of stealing a trophy and locket; Emily plans a party.
Episode #110 Original Airdate: Sept 15, 2000.
2760
BACK REMIND ME
2750
2770
Mosaic
Setup
THEATER
Mosaic
REMINDER
Channel 10 at 4:00pm
< TV CBL VCR >
TV/VID
PWR
1 2 3
4 5 6
7 8 9
Prev 0 Enter
24
2790
Mosaic
VOL
CH
M

FIGURE 27

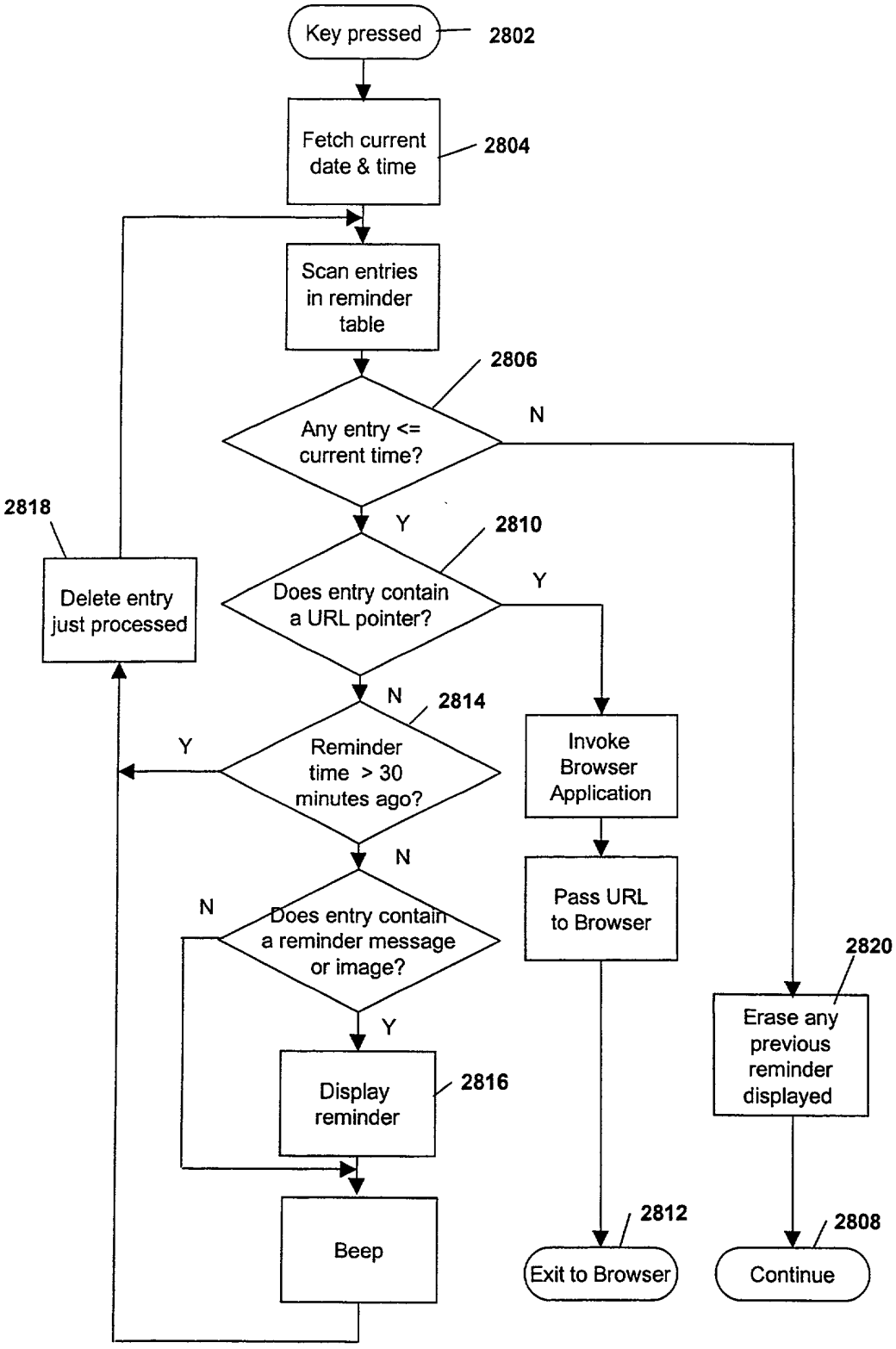

Key pressed
2802
Fetch current date & time
2804
Scan entries in reminder table
2806
Any entry <= current time?
N
Y
2818
Delete entry just processed
2810
Does entry contain a URL pointer?
Y
N
2814
Reminder time > 30 minutes ago?
Y
N
Does entry contain a reminder message or image?
N
Y
Display reminder
2816
Beep
Invoke Browser Application
Pass URL to Browser
2812
Exit to Browser
2820
Erase any previous reminder displayed
2808
Continue

FIGURE 28

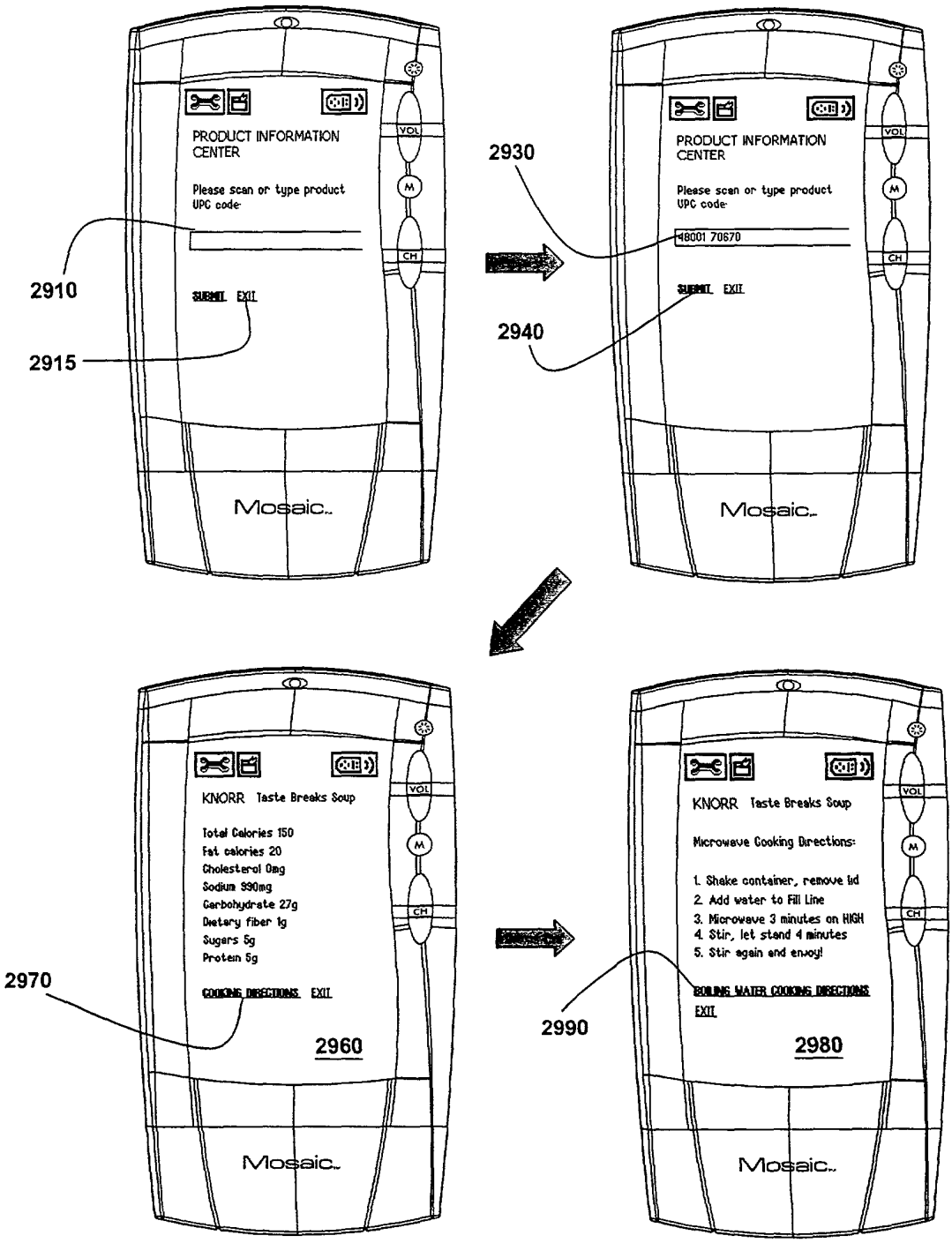
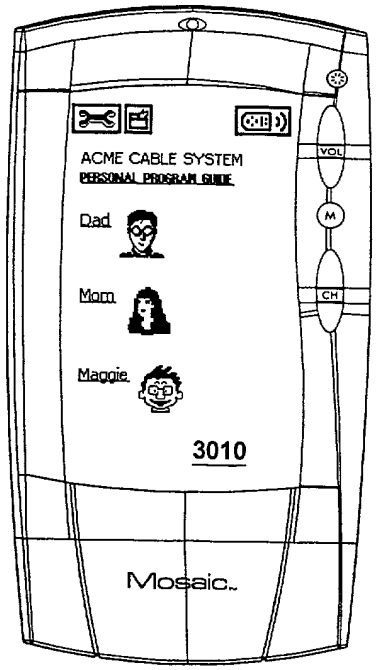
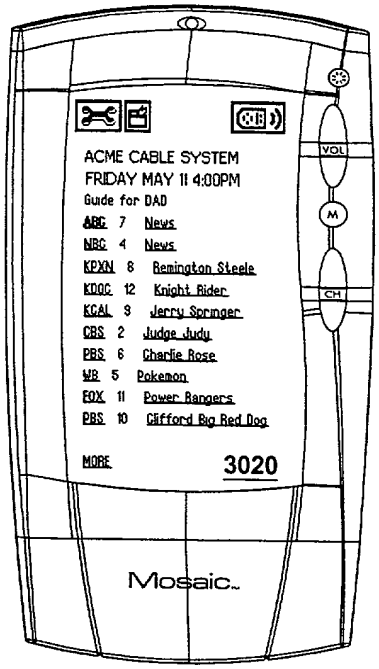
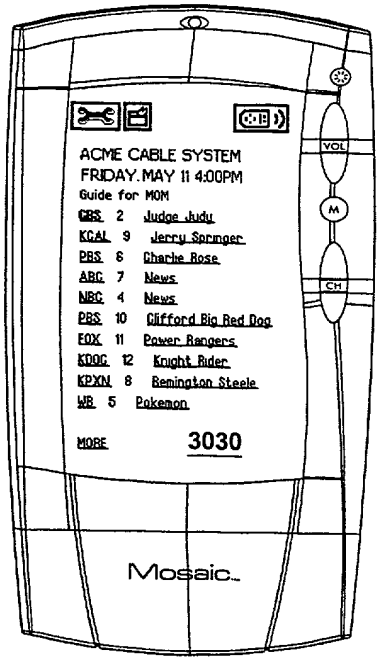

PRODUCT INFORMATION CENTER
Please scan or type product UPC code
SUBMIT EXIT
2910
2915
2930
48001 70670
2940
KNORR Taste Breaks Soup
Total Calories 150
Fat calories 20
Cholesterol 0mg
Sodium 990mg
Carbohydrate 27g
Dietary fiber 1g
Sugars 5g
Protein 5g
COOKING DIRECTIONS EXIT
2960
2970
Microwave Cooking Directions:
1. Shake container, remove lid
2. Add water to Fill Line
3. Microwave 3 minutes on HIGH
4. Stir, let stand 4 minutes
5. Stir again and enjoy!
BOILING WATER COOKING DIRECTIONS
EXIT
2980
2990
VOL
M
CH
Mosaic

FIGURE 29


ACME CABLE SYSTEM
PERSONAL PROGRAM GUIDE
Dad
Mom
Maggie
3010
VOL
M
CH
Mosaic


ACME CABLE SYSTEM
FRIDAY MAY 11 4:00PM
Guide for DAD
ABC 7 News
NBC 4 News
KPXN 8 Remington Steele
KDOC 12 Knight Rider
KCAL 9 Jerry Springer
CBS 2 Judge Judy
PBS 6 Charlie Rose
WB 5 Pokemon
FOX 11 Power Rangers
PBS 10 Clifford Big Red Dog
MORE
3020
VOL
M
CH
Mosaic


ACME CABLE SYSTEM
FRIDAY MAY 11 4:00PM
Guide for MOM
CBS 2 Judge Judy
KCAL 9 Jerry Springer
PBS 6 Charlie Rose
ABC 7 News
NBC 4 News
PBS 10 Clifford Big Red Dog
FOX 11 Power Rangers
KDOC 12 Knight Rider
KPXN 8 Remington Steele
WB 5 Pokemon
MORE
3030
VOL
M
CH
Mosaic

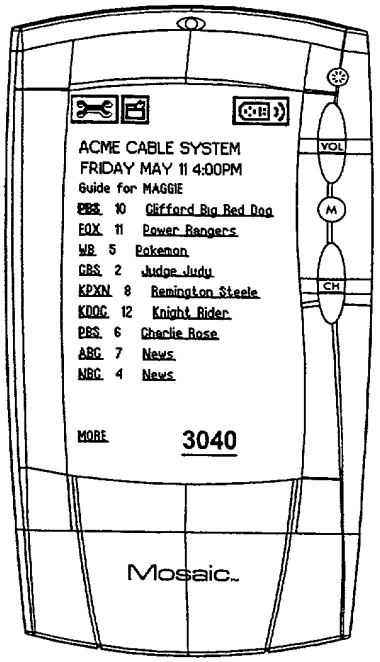

ACME CABLE SYSTEM
FRIDAY MAY 11 4:00PM
Guide for MAGGIE
PBS 10 Clifford Big Red Dog
FOX 11 Power Rangers
WB 5 Pokemon
CBS 2 Judge Judy
KPXN 8 Remington Steele
KDOC 12 Knight Rider
PBS 6 Charlie Rose
ABC 7 News
NBC 4 News
MORE
3040
VOL
M
CH
Mosaic

FIGURE 30